

Coal Age

A MCGRAW-HILL PUBLICATION

JANUARY, 1948



BUSINESS FOR COAL p. 58

The CLARKSON

THE LOWEST LOADING
MACHINE ON WHEELS

Redbird

TYPE 24 BB



Quick operating hydraulic controls conveniently located in one central unit.

Telescopic hydraulic jack adjustable to any car height — with oversize cylinders for low hydraulic pressure.

Rear conveyor ELEVATED IN ONE SECOND to meet any car height. Conveyor in TRAVELING POSITION WELL BELOW TROLLEY WIRES even in very low coal — highest point of conveyor pan only 23 inches from rails.



The CLARKSON
MANUFACTURING CO.
Nashville



Hose sucks up 600 pounds of wheat a minute

A typical example of B.F. Goodrich development in rubber

MILLIONS of tons of wheat have to get from farm to boxcar to storage bin in a hurry in the harvest season. Cars must be unloaded quickly—to get back and pick up more. So grain companies installed steel pipes that suck grain from boxcar to bin, with a flexible steel tube to move around the car and pick up grain in any part of it.

But the steel couldn't stand it. Friction of the grain made the steel too hot to handle, and wore holes in the curved sections. The whole system had to shut down for frequent repairs.

One grain company came to B.F. Goodrich and asked if rubber hose might do. B.F. Goodrich engineers, who had designed more than 1000 kinds of hose, went to work. They developed one strong enough to stand the powerful suction without collapsing. They made the lining smooth so that friction heat is no longer a problem. The lining compound they used (originally developed for lining gravel chutes) withstands friction better than steel, so the rushing grain doesn't wear it out.

This B.F. Goodrich hose was installed six months ago, and unloads

a 40-ton boxcar in 2½ hours. Steel tubing wore out in a few days. The rubber hose has shown no signs of wear in six months.

This hose illustrates a B.F. Goodrich principle—adapting to your problem the experience of long years of solving thousands of problems for industry everywhere—experience that may well have developed exactly what is needed in your case. *The B.F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich
FIRST IN RUBBER

JR

v.531

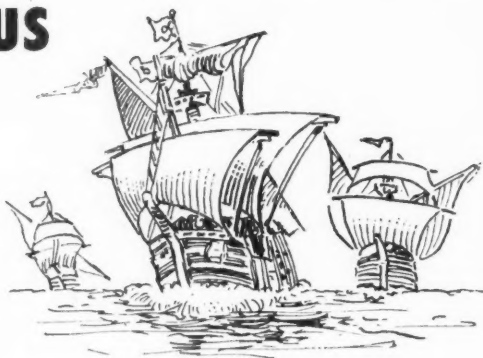
Jan.-June 1948

Make no mistake

FOR
INSTANCE...

Are you mistaken about COLUMBUS

?



Queen Isabella of Spain did not pawn her jewels to finance Christopher. She persuaded the King

to grant him the equivalent of \$6,000 — the voyage cost \$7,200. Columbus would have secured the contract long before 1492 had it not been for the fantastic honors and profits he demanded. What's more, it's said he was so ignorant of navigation that experienced seamen at Palos refused to sail under him!

Be that as it may — COLUMBUS GOT RESULTS; and that's all that really counts! The same idea applies in the matter of lubricating coal mining machinery — use HULBURT QUALITY GREASE, and you'll get the results you demand — i.e. better, longer operation; fewer layups; money saved on repairs. You'll discover all the reasons why, when it comes to coal mine lubrication, so many experienced coal operators refuse to use anything but HULBURT!

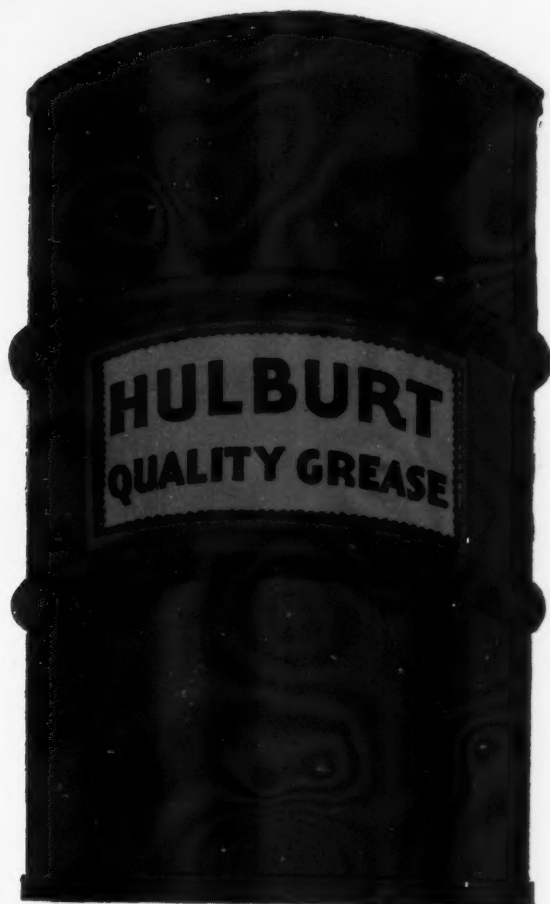
Tech

HULBURT OIL & GREASE COMPANY—PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

— for Coal Mine Lubrication

use



HULBURT

Quality **GREASE**

PROVEN BY PERFORMANCE

**TAKE THE
LOAD DOWN..**

**... WITH LESS
WEIGHT**



Many installations have proved the advantages of light-weight aluminum conductors when used in long-lived Hazard Borehole Cable.

HAZARD ALUMINUM BOREHOLE CABLE...is easier to handle... quicker to install...permits deeper borehole suspensions without steel armor

HANGING a borehole cable is usually the shortest, most direct method to transmit electrical power to the lower mine levels — and it's not too difficult a job. The development of Hazard Submarine insulation eliminated in most cases the need for heavy, costly lead sheathing and permitted suspension in many cases merely by the conductors. Now, still another weight and cost reducing development is offered you with Hazard aluminum conductor borehole cable.

Since aluminum weighs only about one-third as much as copper, aluminum borehole cables are easier to handle, cut installation time. The light weight adds considerably to the length of borehole cables that can be installed without steel armor suspension.

The service record of aluminum conductors goes back nearly half a century. They have been used successfully for electrical transmission lines, power feeders, lighting circuits and underground installations. Hazard aluminum conductor borehole cables now in use prove the value of aluminum for use in the mining field.

With a little experience, you'll find aluminum conductors are as easy to work with as copper. Today more and more aluminum conductors are being used in all types of electrical service.

Get all the facts and information you want from your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

insulated wires and cables for every mining use

6242

Coal Age

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330 West 42nd St., New York 18, N. Y.

Please change the address of my COAL AGE subscription as follows:

Name

Old Address

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New Company Connection

New Title or Position

Why Bethlehem Prefabricated Track *IS EASY TO INSTALL*

Reason 1: It's *planned* track. This means on-the-job study. Bethlehem engineers spend as many hours or days at your mine as this study calls for. Then they plan, in detail, an easily-assembled track system for your individual workings.

Reason 2: The number of rail lengths and curvatures is held to an absolute minimum.

Reason 3: Cutting to exact lengths, curving to proper radii, and necessary prefabricating are done by Bethlehem in its own shops. Rails and other equipment are match-marked to simplify assembly in the mine.

Reason 4: Rail lengths are such that no more than two men are needed to handle any track component.

Reason 5: A Bethlehem prefabricated system means flexibility. Because of Bethlehem's reversible stock rail, a left-hand turnout can be dismantled and reassembled as a right-hand turnout, and vice versa. The switch-stand ties furnished can also be used on either left- or right-hand side of a left- or right-hand turnout.

Reasons 6, 7, 8, and on up: Better let us tell you about these in person—we haven't room here. Call us any time; our engineers are at your disposal.

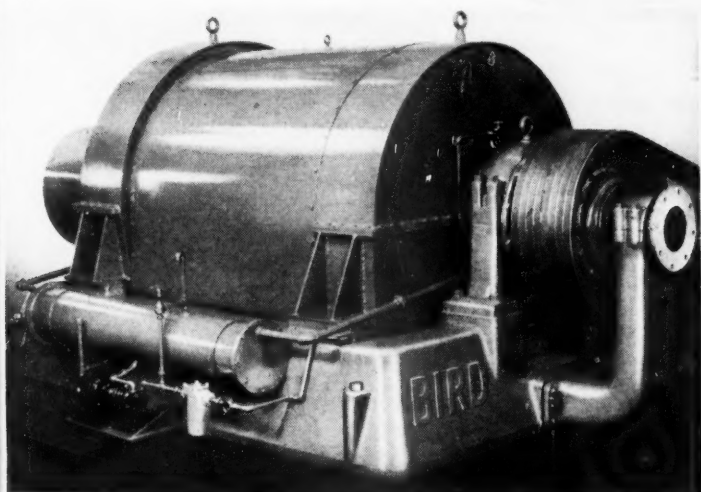
A Bethlehem prefabricated turnout, including switch stand, switch, stock and closure rails, special switch and turnout ties, regular steel ties, and frog.



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

**HOW TO GET THE
WATER OUT OF YOUR
WASHED FINES — CLEAN
WATER THAT CAN BE
USED OVER AND OVER**



The one best way to do it is with the Bird Continuous Centrifugal Filter.

It separates the water from your washed fine coal just as it comes from your washing system.

It turns out the coal so dry that it is all ready for blending with the larger sizes.

It handles big tonnage over long periods of time without parts replacements.

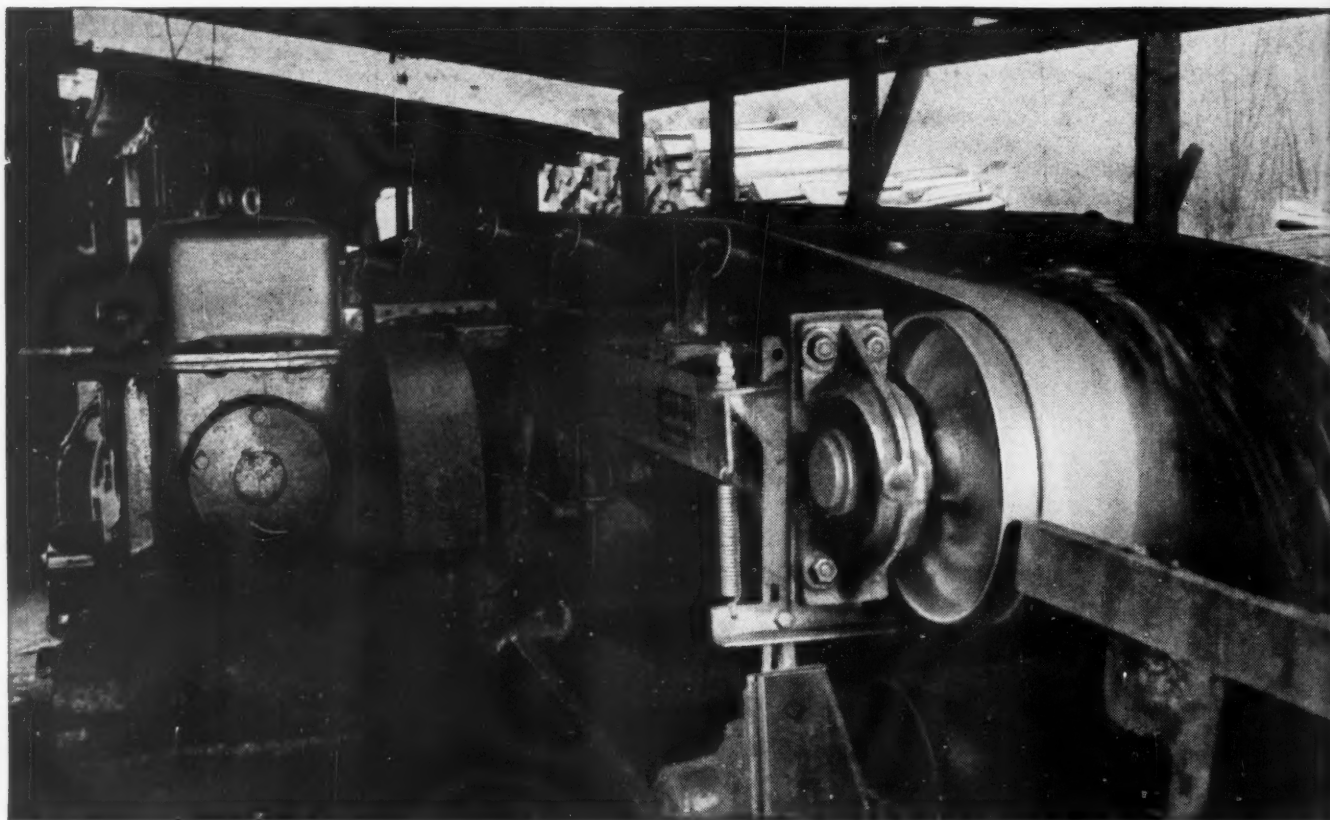
For full information get in touch with

BIRD MACHINE COMPANY, South Walpole, Mass.

The BIRD

**Continuous
Centrifugal**

FILTER



Here's coal moving out on the double!

We mean coal that is removed from your mine with a Robins Mine Conveyor.

With a Robins, you move out *more* coal . . . and you do it at *less cost per ton!*

You can use a Robins Mine Conveyor level, uphill or downhill . . . with equal efficiency and with equal economy.

You install its sections by simply dropping them into place. Because of this drop-in construction, the Robins Mine Conveyor is able to follow the uneven contour of your mine's floors.

Its low height enables it to follow the seam. It can receive material from any kind of feeding mechanism you employ.

With a Robins Mine Conveyor you'll move coal out on the double. You'll enjoy years of top-notch performance. It is built to take years of hard abuse and never bat an eye.

Ajax Conveyor Belting, made by Hewitt, is the perfect running mate for your Robins Mine Conveyor. Ajax

is a tough, durable belting, specially treated to resist moisture and mildew.

Remember . . . Hewitt-Robins is the *only* company that assumes responsibility for *both* conveyor and belting. It is the only company that can bring you a *complete* conveying system engineered *as a unit* to your exact requirements.

Get the full story of the savings possible in your particular operation. Write *today* to Robins Conveyors Division, Passaic, N. J.

COMPARE THESE EXCLUSIVE ROBINS ADVANTAGES WITH ANY OTHER MINE CONVEYOR

1. **REQUIRES LESS HEAD ROOM.** Only 15" to belt line on intermediate and tail sections.
2. **YOUR CHOICE OF TAKE-UPS.** Tail or intermediate types.
3. **YOUR CHOICE OF WIDTHS.** 26", 30" or 36", in lengths up to 3,000 feet.
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5. **SIMPLIFIED LUBRICATION.** Equipped with famous Robins Idlers—with exclusive patented One-Shot lubrication. Lubricated from one side only . . . and from either side.
6. **SINGLE RESPONSIBILITY.** One company takes complete responsibility for both elements—conveyor and belting.



ROBINS MINE CONVEYOR

ROBINS CONVEYORS DIVISION
HEWITT-ROBINS INCORPORATED
PASSAIC, NEW JERSEY



POWER when you
need it

SPEED
when you want it

EATON
2-SPEED
Truck
AXLES

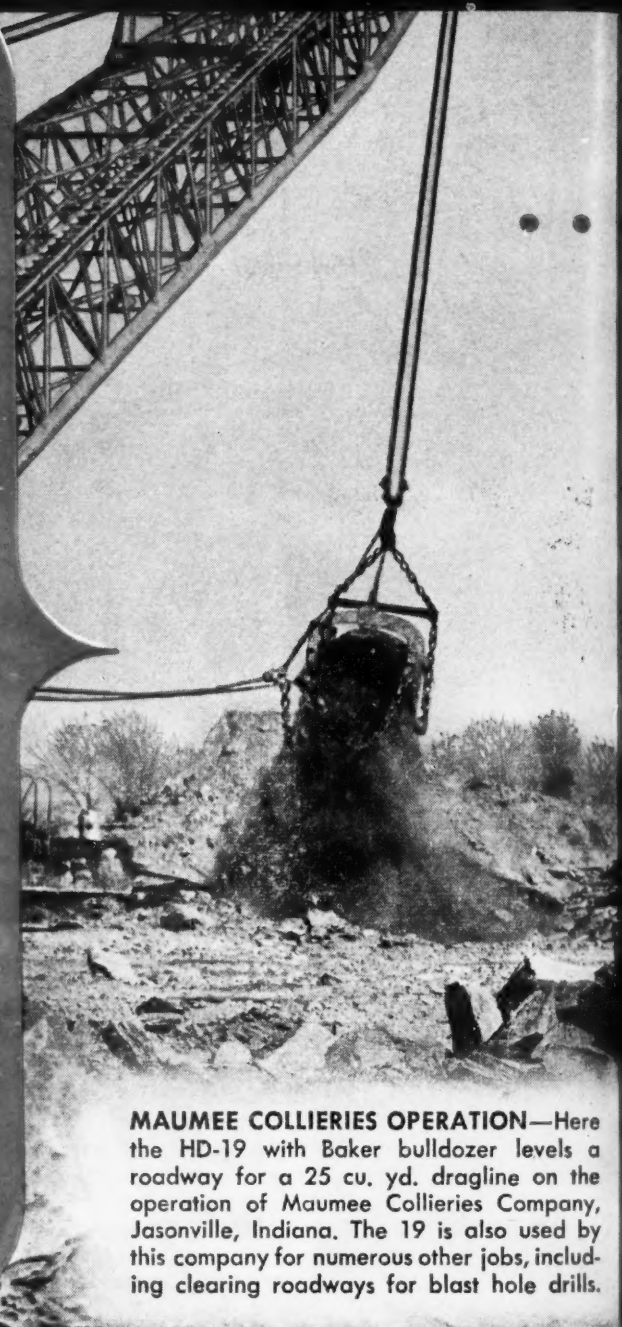
MORE THAN $\frac{3}{4}$ OF A MILLION EATON 2-SPEED AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY

Axle Division

CLEVELAND, OHIO

How to get **BIG** **YARDAGE** *at Lower Cost!*



MAUMEE COLLIERIES OPERATION—Here the HD-19 with Baker bulldozer levels a roadway for a 25 cu. yd. dragline on the operation of Maumee Collieries Company, Jasonville, Indiana. The 19 is also used by this company for numerous other jobs, including clearing roadways for blast hole drills.

Let this rugged, tough, Allis-Chalmers HD-19 tractor strip off the top overburden . . . save your big, costly draglines and shovels for removal of shale, rock, boney and similar strata. This way you will be making the most efficient use of each machine . . . result will be lowest possible cost per yard.

Also use the fast-working, smooth-operating HD-19 for cleaning-up around strippers and for

pushing material within their reach; for leveling roadbeds for them to move over and work on . . . for cleaning roadways for blast hole drills . . . for pulling heavy equipment . . . building roads . . . or as a stripping unit in its own right, working with bulldozers and scrapers.

Whatever the job—this world's largest, most powerful tractor will get it done at less cost to you.

ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

... Originator of the
Torque Converter Tractor

Team up this **WORLD'S LARGEST,
MOST POWERFUL TRACTOR**
with Your Big Strippers



Allis-Chalmers **HD-19** *Rugged and Tough
— Built to Outproduce
and Outlast!*

COMPLETELY NEW...with HYDRAULIC TORQUE CONVERTER DRIVE

**BUILT TO GET
MORE WORK DONE**

- Weight: 40,000 pounds.
- Power: 2-Cycle General Motors Diesel — 163 hp. at flywheel.
- Torque converter automatically balances load and speed without gear-shifting.
- Speeds: 0 to 3.0 in low gear and 0 to 7.0 in high; reverse, 0 to 5.5.
- More traction, more ground contact, better balance.

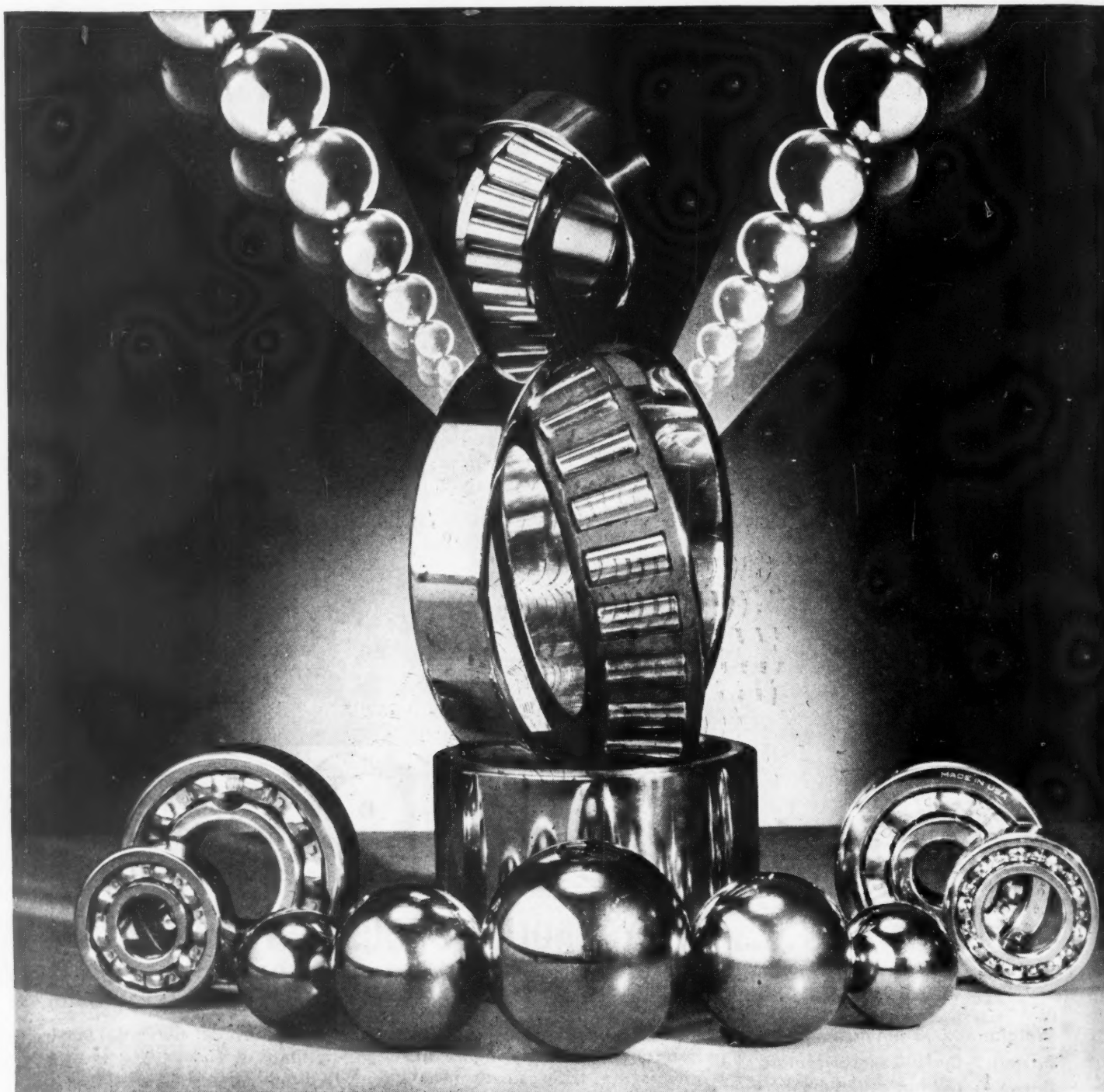
**BUILT TO LAST LONGER
WITH LESS UPKEEP**

- Torque converter smooths tractor performance—cushions engine and transmission from shock loads.
- Simplified maintenance—major assemblies conveniently serviced or removed. Operating adjustments easily reached, quickly made.
- Reduced lubrication—greasing intervals lengthened throughout . . . 1,000 hours on truck wheels, support rollers, front idlers.
- High clearance—over 16 inches.

**BUILT FOR EASIER CONTROL &
GREATER OPERATOR COMFORT**

- Torque converter eliminates most shifting.
- Hydraulic, finger-tip steering.
- Convenient controls.
- Self-energizing brakes.
- New type, adjustable split seat.
- Wide arm rests.
- Adjustable brake pedals.
- Full visibility.
- Comfortable foot rests.
- Clean platform.

PROTECT THE BEARINGS



Tune in . . .
TEXACO STAR THEATRE
presents the
TONY MARTIN SHOW
every Sunday night.
METROPOLITAN OPERA
broadcasts
every Saturday afternoon.



TEXACO LUBRICANTS

THAT SPEED THE TONNAGE

Assure Longer Life and Lower Maintenance Costs with **Texaco Regal Starfak No. 2**

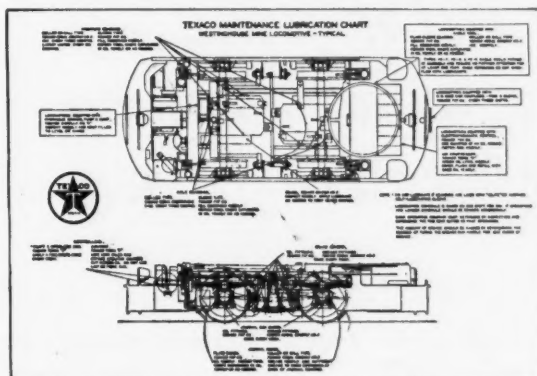
DIRECTLY and indirectly, tonnage depends on ball and roller bearings — in machinery such as electric motors, fans, locomotives, etc. Where grease-lubricated, use *Texaco Regal Starfak No. 2*. It tops every standard set for an ideal anti-friction bearing lubricant.

Texaco Regal Starfak No. 2 is stable under all operating conditions . . . resists oxidation and gum formation . . . stands up under high and low temperatures. It stays *in* the bearings . . . resists separation, leakage and washout. Fewer applications are needed.

In addition, *Texaco Regal Starfak No. 2* is easy to handle . . . easy to apply . . . has low starting and running torque, assuring smoother operation, lower power consumption.

In heavy-duty bearings, use *Texaco Marfak Heavy Duty* — the lubricant famous for its ability to give long lasting protection under heavy loads and rough service.

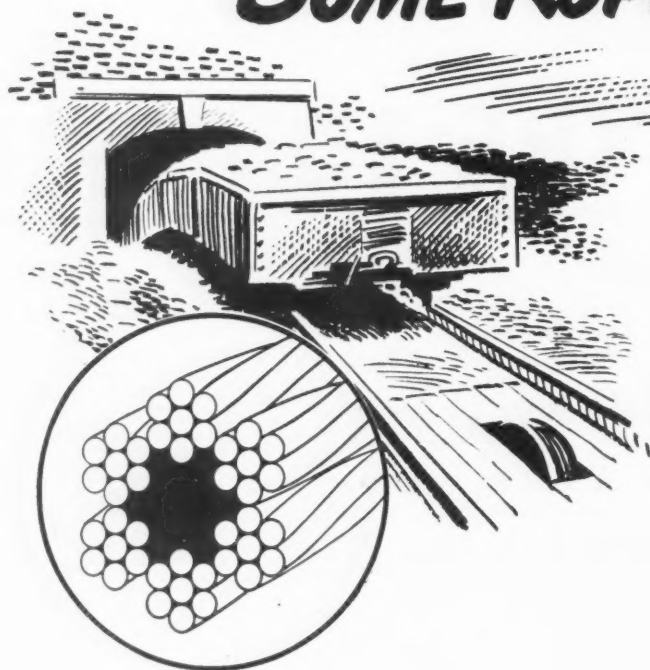
Let a Texaco Lubrication Engineer help you increase bearing life and efficiency. Just call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C*, 135 East 42nd Street, New York 17, N. Y.



TEXACO MAINTENANCE LUBRICATION CHARTS: Leading manufacturers of underground coal mining machinery approve Texaco products for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.

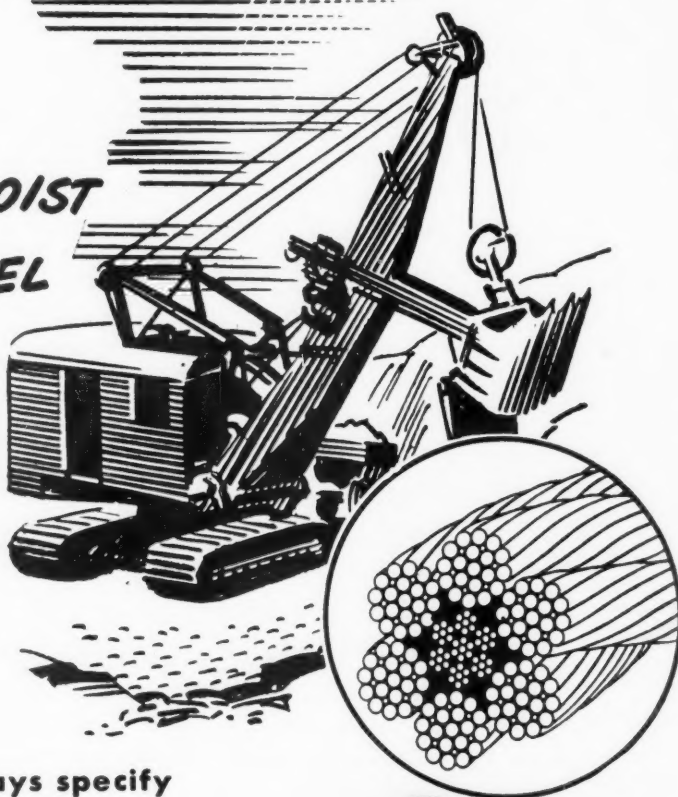
For the Coal Mining Industry

SOME ROPES FOOL YOU



**U-W 6x7 WIRE ROPE
IS GOOD FOR SLOPE
HAULAGES BECAUSE IT
IS COARSE AND
RESISTS ABRASION —
BUT...**

**FOR BOOM FALLS AND HOIST
ROPES ON A POWER SHOVEL
IT'S TOO STIFF. HERE WE
RECOMMEND USING U-W
6x19 FILLER WIRE
CABLE WHICH IS MUCH
MORE FLEXIBLE**



**For longest and best service, always specify
U-W LAYRITE (Preformed) IMPROVED PLOW STEEL**

We invite you to let UPSON-WALTON engineer your tough rope jobs.

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THE UPSON-WALTON COMPANY

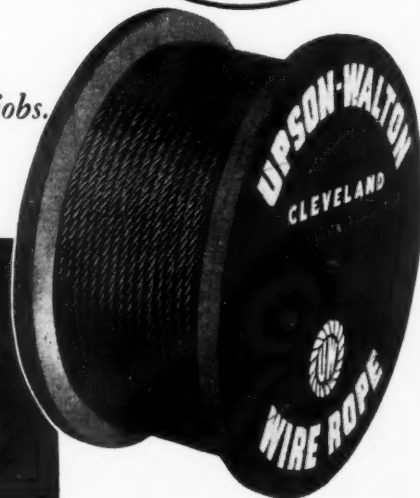
Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

114 Broad Street
New York 4

737 W. Van Buren Street
Chicago 7

241 Oliver Building
Pittsburgh 22



Pair of Aces

BUY and
SPECIFY
GOODYEAR
— it pays!

to beat the tough jobs



MANY quarry and strip-mine operations call for two types of tires, job-tailored to fit a two-way hauling problem: (A) Off-the-road hauling from pit to crusher — (B) both OFF and ON-the-road hauling from stock pile to delivery points.

For (A) you need Goodyear's Hard Rock Lug. This super-stamina tire stands up longer—beats down cost-per-ton. That's why the Hard Rock Lug is first choice for off-the-road work in quarries and strip mines.

For (B) you need the dual-purpose Road Lug tire, built with alternate long and short lugs for traction off-the-road, plus long life and outstanding mileage on the highway.

These two ace performers are tops in toughness. Both are built with super-strong rayon cord and extra-heavy treads. Each rolls on a tread specially designed for its special type of work. Together they pair up into the greatest tire values we have ever offered for rock work. You'll find it pays off in hard cash savings to equip with the one that best fits your needs.

Road Lug—T. M. The Goodyear Tire & Rubber Company



GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

NEW MANUAL PRESENTS Pre-Engineered TEXROPE DRIVES!

TEXROPE
.. Greatest
Name in
V-Belt Drives



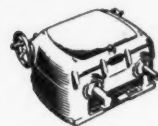
"Super 7" V-BELTS
Five Types — Sizes
to suit every power
transmission job.



Texsteel, Texdrive,
"Magic-Grip"
— sheaves in a full
range of sizes,
grooves.



"Vari-Pitch"
SHEAVES
Exact variations in
speed, stationery or
motion control.

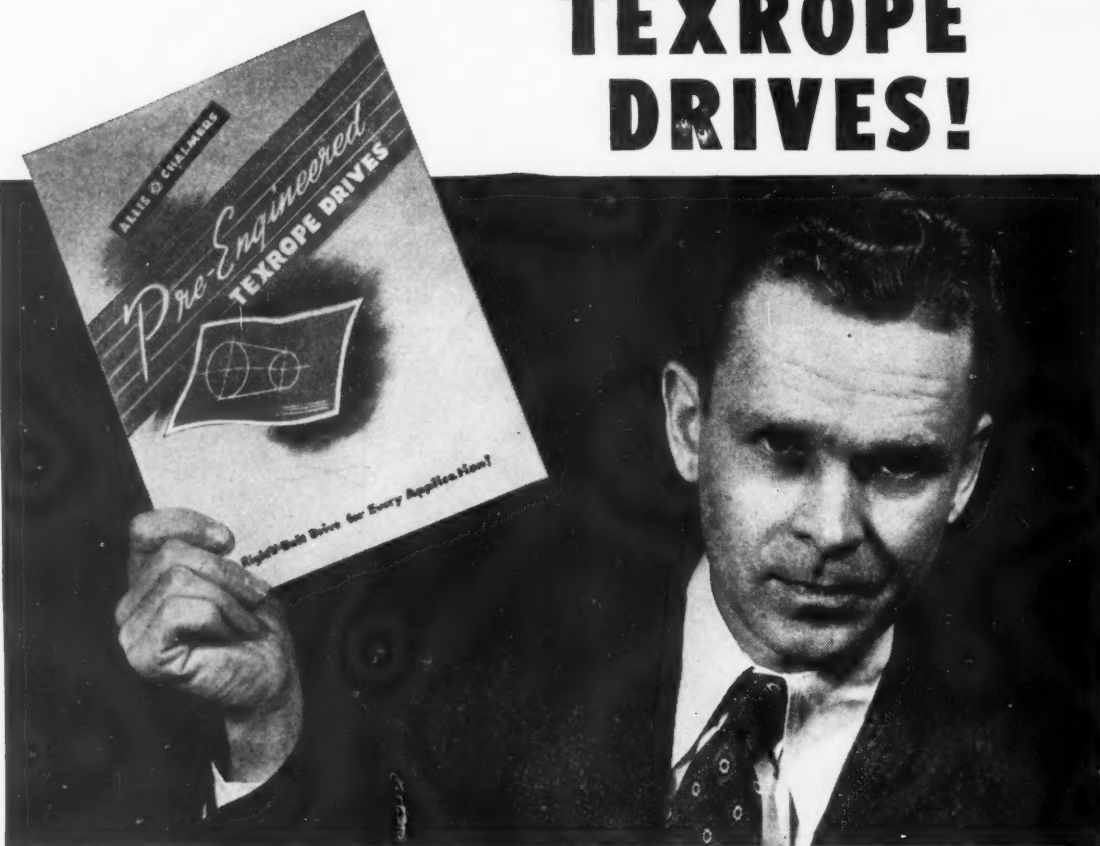


**SPEED
CHANGERS**
Speed variations up
to 375% at the turn
of a crank.

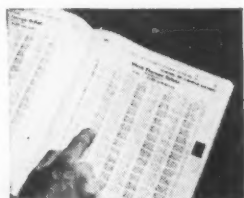


ENGINEERING
Finest V-Belt engi-
neering talent in the
world—at your call.

TEXROPE "Super
7" V-Belts result
from the cooperative
research of two great
companies — Allis-
Chalmers and B. F.
Goodrich. They are
sold only by A-C.



*Selects Most Economical
Drive for Any Installation!*



NEVER BEFORE has specification of the right V-belt drive been made so simple, so unerring. You turn to a page, run down a column, and there, in *one place* is the drive you need... number of grooves, diameters of sheaves, size of belt. No turning from table to table, no figuring.

These *Pre-Engineered* stock Texrope drives cover 90% of all requirements. Texrope engi-

neers have carefully selected each one, using economical *stock* belts and sheaves. Each selection is the *one best drive* for a given requirement of power, speed and dimension.

For the few cases not covered by *Pre-Engineered* stock drives, the manual provides complete, carefully arranged engineering data to make it easy to figure special drives.

Now Available . . . 144 pages, indexed, size 8½ by 11 inches. The most complete V-belt drive manual ever published. A book that only Allis-Chalmers can give you. Copies have been sent to many Texrope dealers and users. If you have not received one, write for Texbook No. 20P40. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2333

Texrope, Super-7, Texsteel, Texdrive, Magic-Grip and Vari-Pitch are Allis-Chalmers Trademarks

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products





JOY

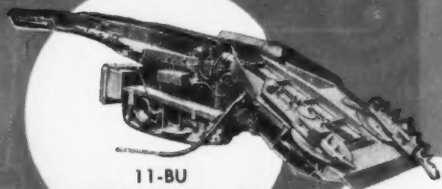
LOADERS

**HANDLE TONNAGE FASTER—
AT LESS COST PER TON**

High seam or low seam—Joy makes a loader that will do the job better, faster, more economically. Moreover, maximum loading rates are easy to maintain with these extremely flexible Joy Loaders.

Consult a Joy Engineer

DETROIT PUBLIC LIBRARY



11-BU
FOR HIGH SEAMS



14-BU
FOR LOW SEAMS



8-BU
FOR CONVEYOR
MINING

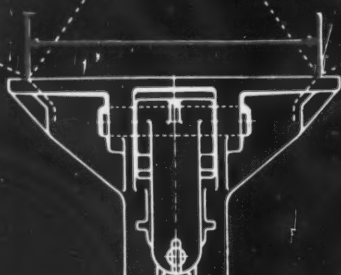
W&D CL 126

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

BUILT FOR

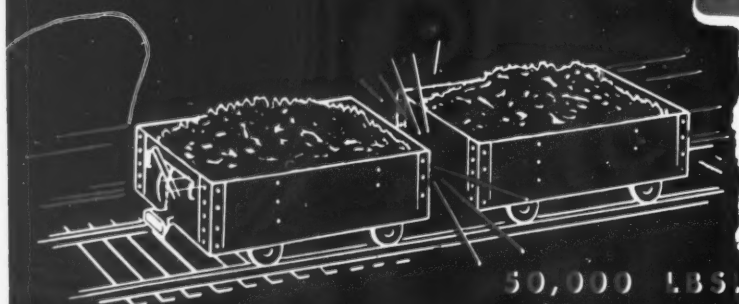
15" GATHERING RANGE



... ON CURVES

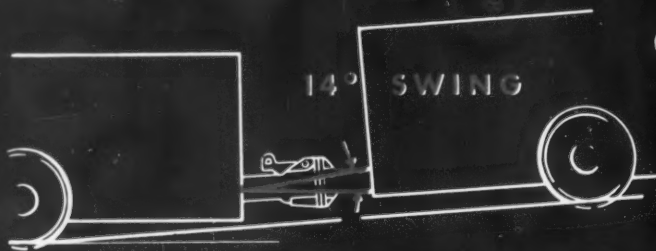
Male-and-female type coupler heads provide the O-B Automatic Coupler with 50 percent more gathering range than is found in ordinary couplers. Depending upon the car construction and its relation to the track, O-B Couplers will enable cars to operate over and automatically couple upon curves of minimum radius.

... UNDER HEAVY IMPACT



Tough, springy rubber buffing pads replace breakable steel springs in O-B's modern draft gear assembly. Completely enclosed, the rubber draft gear will absorb impact blows up to 50,000 pounds—as much as 100,000 pounds with the Form-8 design.

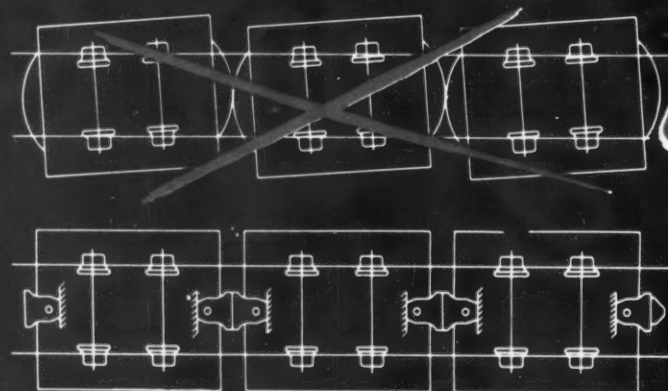
... OVER DIPS AND KNUCKLES



14° SWING

A vertical swing of 14° enables O-B Couplers to operate over sharp breaks in grade. All movement takes place in the flexible rubber draft gear—the coupler faces remain locked to each other in center-to-center position. In addition, five inches of vertical gathering range permit the couplers to join on a wide range of dips and knuckles.

... ON THE TRACK



Preventing zigzagging under push or buff, O-B Form-8 Couplers actually help to keep your cars on the track. An improved draft gear construction holds the cars tightly in center-to-center position counteracting the car's normal tendency to ride the rail under push or buff.

MINE WORK



Take a good look at the O-B Automatic Coupler in the picture above. It appears to be different from railroad-type couplers. It is different—and for good reasons, too! Railroad-type couplers were developed for railroads with their long stretches of straight track and gradual curves and grades. Mining service imposes an entirely different set of conditions. It requires a coupler which is designed specifically to meet those conditions.

Because mine curves have shorter radii and coupling on curves is frequent, O-B Couplers are provided

with extra-wide gathering range. They permit cars to operate over sharp breaks in grade at dips and knuckles. Their sturdy rubber draft gear will absorb severe impact blows without damage. The O-B Form-8 Coupler exerts a stabilizing pressure to counteract a mine car's normal tendency to derail under push or buff.

If you are considering the purchase of new mine cars, you will find it profitable to investigate the O-B Automatic Coupler—the coupler that was designed specifically to meet mine operating conditions. A postcard request will bring full information.

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd.,
Niagara Falls, Ontario



THE Sides OF A V-BELT

ARE WHAT
Grip the Pulley,

Pick-up the Load

AND REALLY
Get the Wear!



Diagram
of V-Belt
in Sheave-
Groove



THAT'S WHY THE **Concave Side**
(A GATES PATENT)
IS IMPORTANT TO YOU!

Every ounce of load a V-Belt carries must *first* be picked up by the *sides* of the belt. Clearly so, because *only* the *sides* come into contact with the pulley! The sides do all the *GRIPPING* on the pulley. They get all the wear against the sheave-groove wall. The sides *pick up* the load. They transmit that load to the belt as a whole. And then, once more, the sides—and the sides *alone*—grip the driven pulley and *deliver* the power to it.

That is why you have always noticed that the sidewall of the ordinary V-Belt is the part that wears out first.

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt—and that's why the patented Concave Side is important to you.

The simple diagrams on the left below show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

and the **CONCAVE SIDE** is more important **NOW** than ever before!

Now that Gates **SPECIALIZED** Research has resulted in Super Vulco Ropes capable of carrying much heavier loads—fully 40% *higher horsepower ratings*—the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important *now* than ever before!



Fig. 1
Straight Sided
V-Belt



Fig. 1-A
How Straight Sided V-Belt Bulges
When Bending Around Its Pulley

You can actually feel the bulging of a Straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.



Fig. 2
Gates V-Belt with
Patented Concave
Sidewall

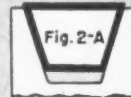


Fig. 2-A
Showing How Concave Side of Gates
V-Belt Straightens to Make Perfect
Fit in Sheave Groove When Belt is
Bending Over Pulley.

No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!



The Mark of
SPECIALIZED Research

THE GATES RUBBER COMPANY
"The World's Largest Makers of V-Belts"
DENVER, U. S. A.

GATES VULCO ROPE DRIVES

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71 Foreign Countries

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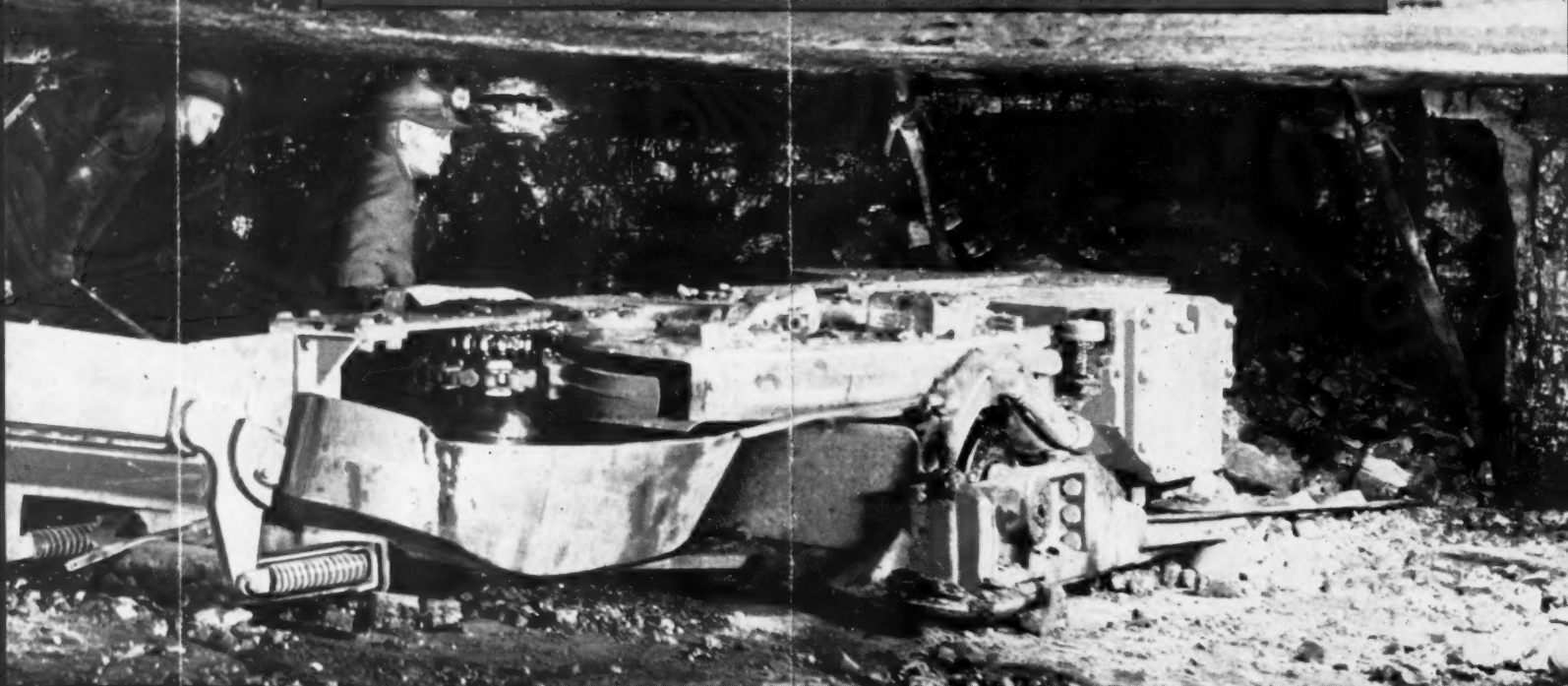


Top Left: Here the 43-L is shown sumped with the two loading bars in position to load.

Top Right: The two workers provide a sense of scale for the machine.

The large view shows the complete set-up of the 43-L "SHORTWALOADER", loaded and connected by the centering truck.

WHEREVER COAL IS MINED YOU'LL FIND SOME TYPE OF J.M. SHORTWALOADER



with the

Top Right: The two loading bars are in action as the machine moves across the face.

of the 43-L "SHORTWALoader", loading into a room conveyor and directed by the centering truck.

FIND SOME TYPE OF JEFFREY EQUIPMENT



J

43

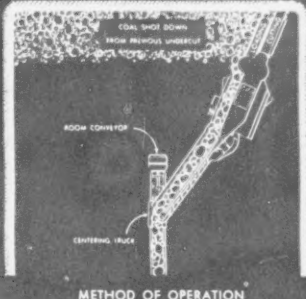
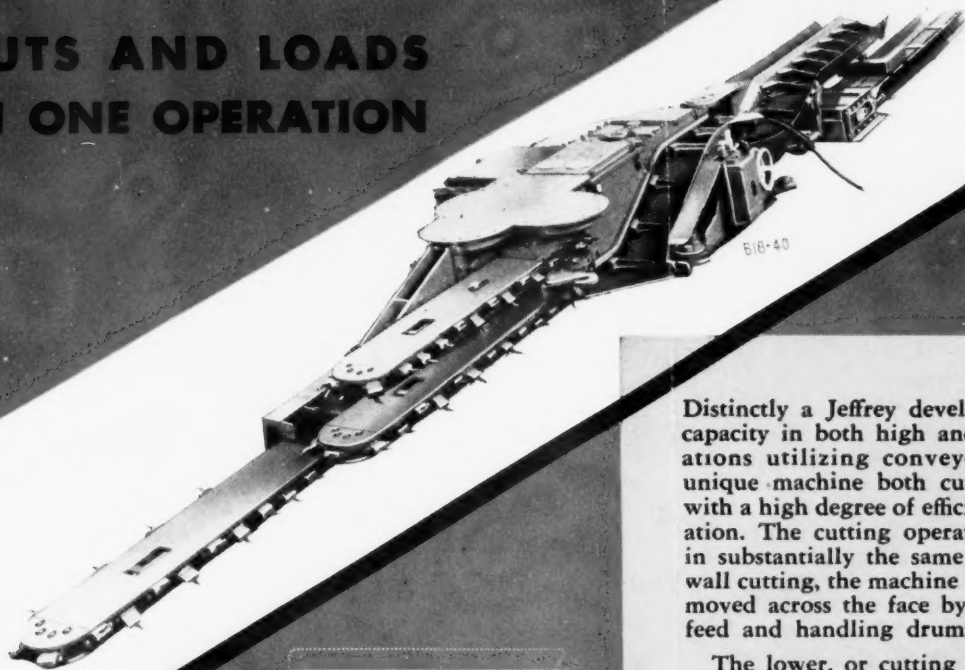
CU
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JEFFREY

43-L "SHORTWALLOADER"

(Patented)

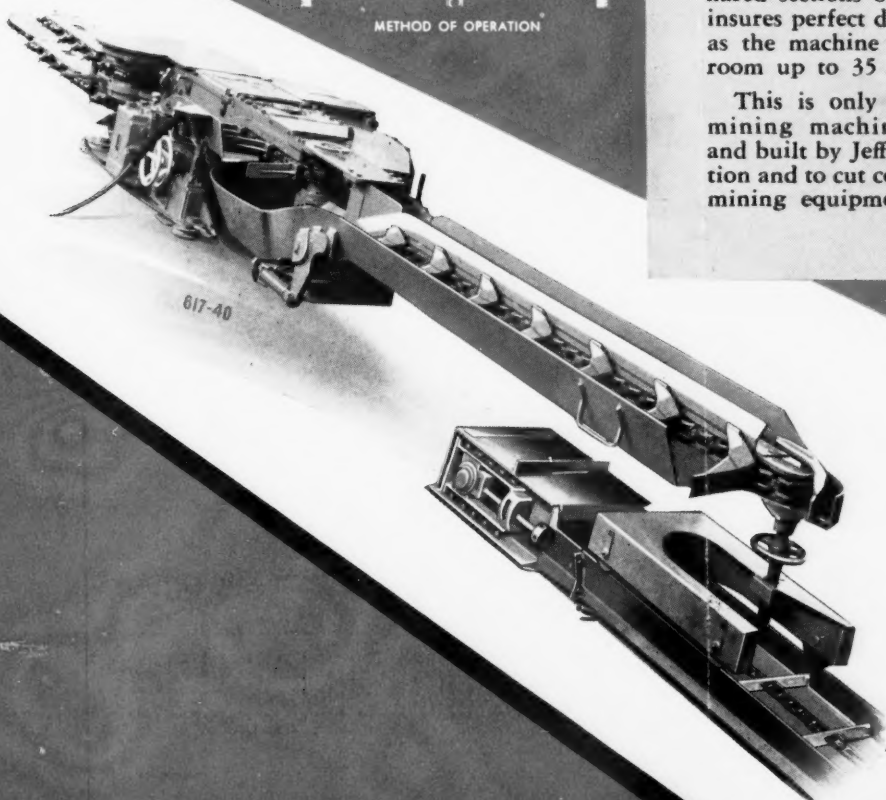
CUTS AND LOADS IN ONE OPERATION



Distinctly a Jeffrey development for high capacity in both high and low seam operations utilizing conveyor mining. This unique machine both cuts and loads coal with a high degree of efficiency, in one operation. The cutting operation is performed in substantially the same manner as short-wall cutting, the machine being sumped and moved across the face by means of similar feed and handling drums.

The lower, or cutting bar, is sumped in to make the undercut, while the two top, or loading bars, also equipped with bits, force the shot down coal into the conveyor section to be carried to the room conveyor. (See diagram). Discharge conveyor is pivoted to extend over the centrally-located room conveyor regardless of angle of loading machine. A centering truck, equipped with four flanged wheels, is pivotally anchored to the discharge conveyor and rides on the flared sections of the room conveyor. This insures perfect discharge, without attention, as the machine feeds across the face of a room up to 35 ft. in width.

This is only one of numerous modern mining machines, engineered, developed and built by Jeffrey to increase coal production and to cut costs. Consult Jeffrey on your mining equipment requirements.



LOADING



DRILL



U CO



SHORT

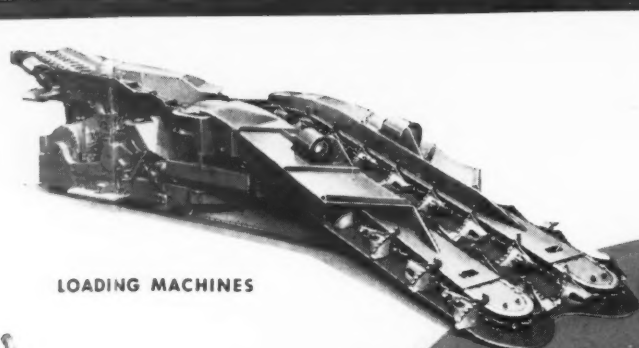
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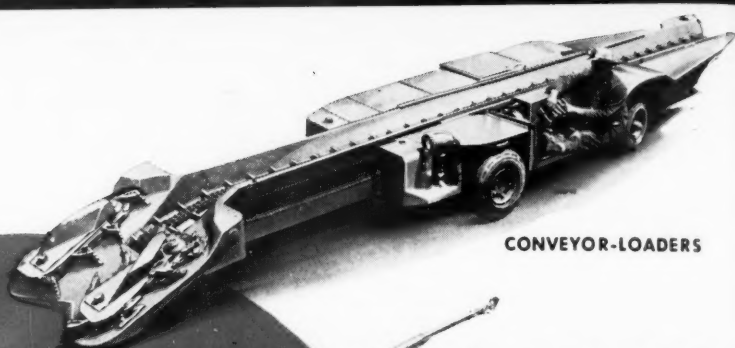
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Service

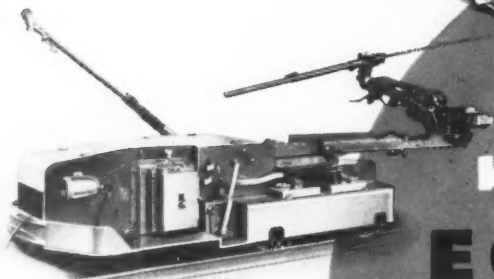
Foreign



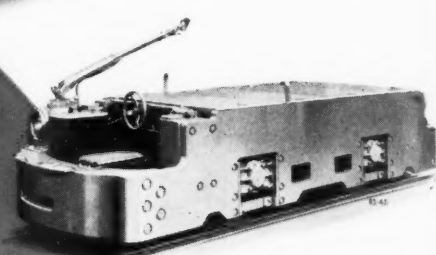
LOADING MACHINES



CONVEYOR-LOADERS

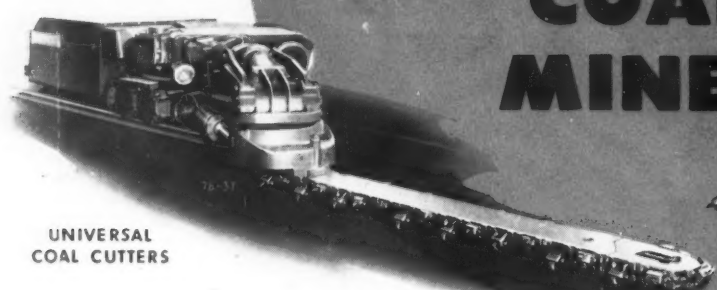


DRILLS AND
DRILLING MACHINES



TROLLEY AND STORAGE
BATTERY LOCOMOTIVES

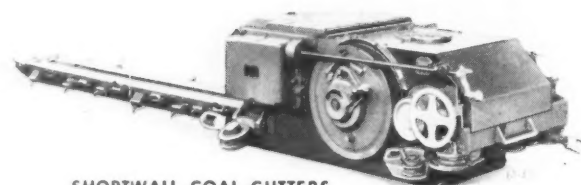
JEFFREY EQUIPMENT FOR COAL MINES



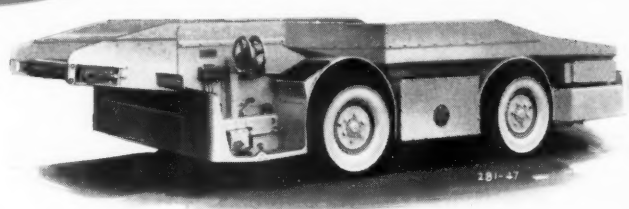
UNIVERSAL
COAL CUTTERS



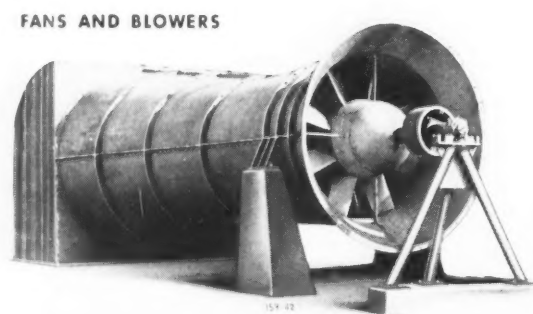
SHORTWALLOADERS



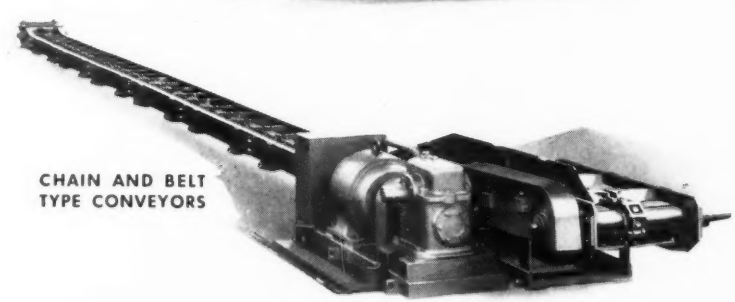
SHORTWALL COAL CUTTERS



SHUTTLE CARS



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AND GENUINE RENEWAL PARTS

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LUBE MEMO

Easy way to end sticky valve trouble

Sticky gum on our valves

Ex. valve on #1 isn't closing - loss of compression and power.

Nelson brags RPM DELO Oil keeps his valves clean as a whistle.

Nelson says compounds in RPM DELO Diesel Engine Lubricating Oil keeps valves free 3 ways:

- 1. Anti-oxidant stops gum formation*
- 2. Metal adherent keeps oil film on stem - prevents wear.*
- 3. Detergent cleans away carbon deposits.*



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KOEHRING

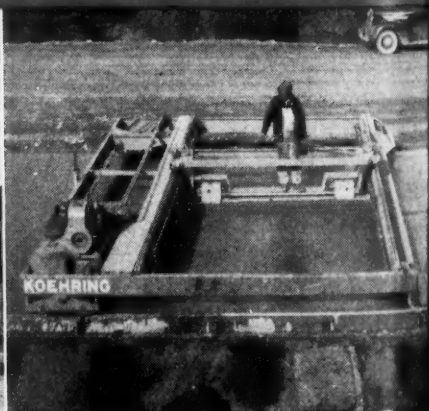
No turn-time...



Other Koehring Heavy-Duty units to help you



Koehring excavators range in size from $\frac{1}{2}$ yard up. Each built to exacting Heavy-Duty standards. See the Koehring 605 (1 $\frac{1}{2}$ yard), Koehring 304 ($\frac{3}{4}$ yard), Koehring 205 ($\frac{1}{2}$ yard).



Koehring Pavers have poured more concrete highways than any other. Get Bulletin on Koehring 34-E Twinbatch, New 1947 model of a famous line. Ask about Koehring Longitudinal Finisher, a Koehring exclusive.

DUMPTOR

More Haul-time

Dumptor never turns on shuttle hauls, runs backward as fast as forward

Are slow turns at the shovel, at the dumping point robbing you of important hauling time that could increase your profits? Time your present shuttle haul operation. Find out just how much turning costs you. Then, check Dumptor savings.

Here's How Dumptor Works On Shuttle Hauls:

Reverse speeds, three of them, are just as fast as the three forward speeds. On shuttle hauls, you never turn the Dumptor, either at the shovel or at the dumping point. You come in to the shovel, engine first. Loaded, you travel body first; at the dumping point, you're in the right position for instantaneous dumping, without a single turn.

Transmission Built for Shuttle Work: Dumptors, and only Dumptors, can shuttle without asking for transmission trouble. Unlike the conventional truck transmission, the Dumptor transmission is especially designed for this type of work. Gears that produce reverse travel are just as large as the "forward" gears. That's why there's no undue stress, no need for excessive lubrication, no transmission trouble.

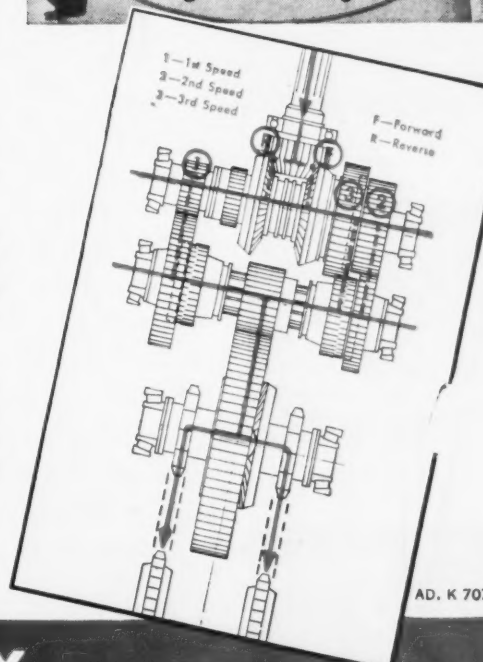
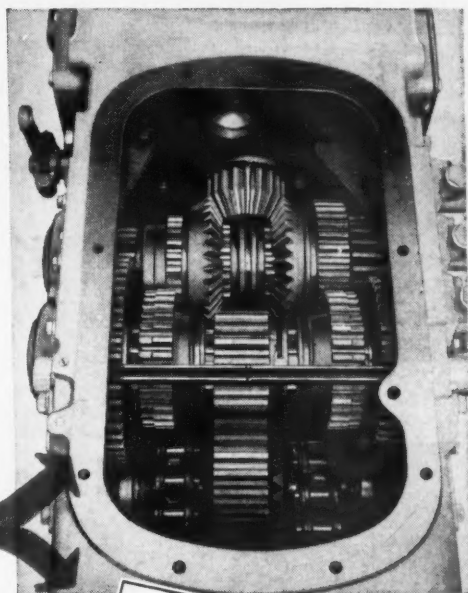
High speed travel without turn delays is only one reason why fewer hauling units will do the job if you're using Dumptors. Here are three other reasons:

Instant Dumping — No Body Hoist: Saves 10 to 20 seconds every time it dumps. No waiting for slow-raising body hoist. Dumps fast even in zero weather. Kick-out pan leaves body clean.

Drive Axle Built For Rock Hauling: Four-inch chrome steel drive axles are heat-treated. Heavy steel case protects entire assembly. Steel dump body has 4" channel reinforcements. Steering axle oscillates to absorb frame-twisting shocks of rough haul roads.

Easy to Maintain: Everything accessible. One man can grease Dumptor in 5 minutes. Clutch pulls out in a fraction of usual time because motor is not moved, transmission case is not touched. Every transmission gear is removable through one cover. No body hoist maintenance, because Dumptor has no body hoist.

Experienced Dumptor engineers are ready to survey your shuttle haul problem. Contact your Koehring distributor today.



AD. K 707



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Only 5 Main Parts

TAKE WEAR IN ALLIS-CHALMERS SOLIDS PUMPS!

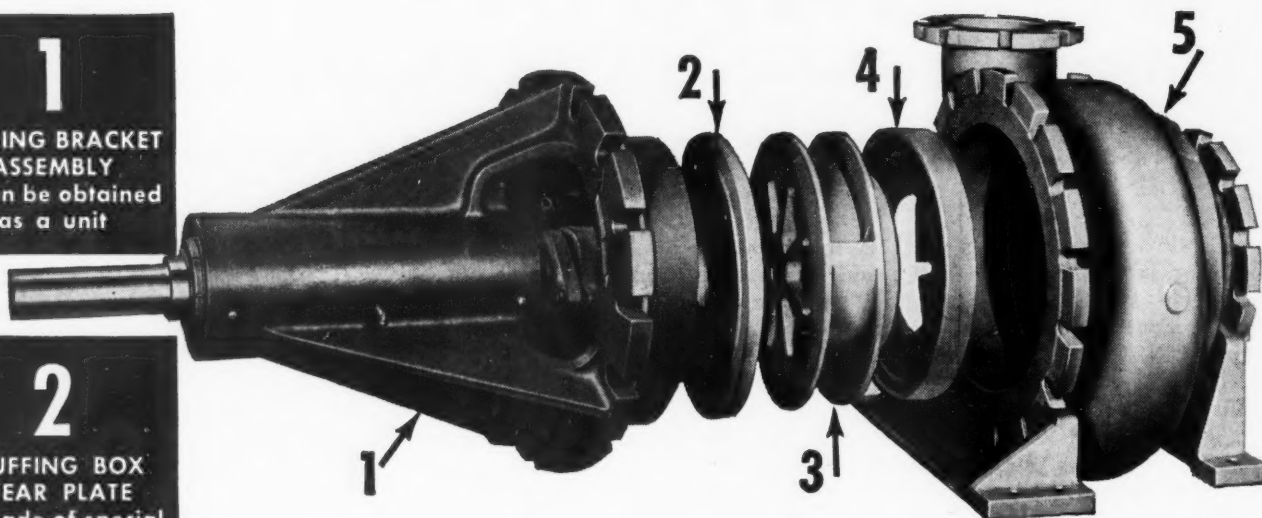
1
BEARING BRACKET
ASSEMBLY
— can be obtained
as a unit

2
STUFFING BOX
WEAR PLATE
— made of special
cast alloy

3
IMPELLER —
designed to pump
slurries of various
consistencies

4
SUCTION WEAR
PLATE — provides
easily maintained
clearance

5
CASING — well
proportioned with
heavy metal
thickness

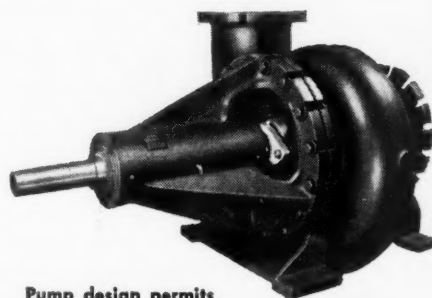


And that means Savings in Time—Low Replacement Parts Cost—Fewer Parts to Stock!

USERS OF ALLIS-CHALMERS Solids Pumps report parts inventory savings up to 70%! Down time slashed as much as 80%! Remarkable results like these are due to the simple design and the special abrasion-resistant alloy construction of these pumps. All parts are quickly and easily accessible. Entire rotating assembly can be removed without disturbing the piping arrangement. Comparable size pumps of different ratings have interchangeable parts.

Allis-Chalmers Solids Pumps are available in 7 sizes ranging from 175 gpm to 7000 gpm. Ask your nearby A-C office or dealer for additional information or write for bulletin 08B6381B. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2343



Pump design permits quick, easy servicing of stuffing box and adjusting of wearing clearances.



ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products



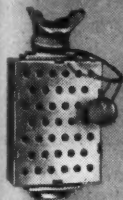
Service-proved Efficiency and Utility
for every required application—

MODERN MINE RESCUE EQUIPMENT *by* **M.S.A**

M.S.A TWO-HOUR OXYGEN BREATHING APPARATUS

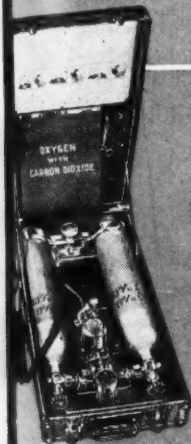
The famous M.S.A. McCaa two-hour apparatus, recognized standard of the mining industry, supplies complete respiratory protection to the wearer in unbreathable atmospheres for a minimum of two hours, under hard physical exertion. Approved by the U. S. Bureau of Mines, the Two-Hour Apparatus employs a high-pressure

oxygen cylinder, and a regenerator which purifies expired breath by removing the carbon dioxide, returning the oxygen content to the circulating system. This Apparatus is the cornerstone of mining protection and rescue programs. Write for Bulletin BB-3.



M.S.A SELF-RESCUER

A miniature gas mask, U. S. Bureau of Mines-approved, belt carried, hermetically sealed until used. This handy, popular equipment protects user against carbon monoxide after fire or explosion for at least 30 minutes. Bulletin EC-74.



H-H INHALATOR

Used in conjunction with artificial respiration, the H-H Inhalator speeds effectively the work of resuscitation by supplying correct oxygen-carbon dioxide mixture to the patient's lungs according to demand—gently, naturally, safely. The Instrument is officially accepted by the Council on Physical Medicine of the American Medical Association, approved by the American Gas Association and the Association of Police and Fire Surgeons. Write for descriptive Bulletin CA-9.



M.S.A **Chemox** OXYGEN BREATHING APPARATUS

Making its own oxygen with a single, replaceable canister as the wearer breathes, Chemox provides a minimum of 45 minutes' respiratory protection in unbreathable air, and is officially approved by the U.S. Bureau of Mines. Simple to use—Chemox supplements other oxygen breathing apparatus types, can be stored underground—and is always ready for immediate use. Bulletin B-14.



M.S.A ALL-SERVICE GAS MASK

Light in weight, comfortable to wear, U. S. Bureau of Mines-approved. Provides protection against gases (including carbon monoxide), fumes and smokes, wherever sufficient oxygen is present in air to support life. Long-lived All-Service canister is quickly replaceable when required—All-Vision facepiece can be put on and adjusted rapidly—sturdy harness contributes to wearing ease. Bulletin EA-8.

Other M.S.A. Rescue Equipment includes: M.S.A. High Pressure Oxygen Pumps . . . M.S.A. Lifeline Reels . . . M.S.A. Carbon Monoxide Detectors . . . M.S.A. Methane Detectors . . . M.S.A. Methane Testers . . . M.S.A. Wolf Flame Safety Lamps . . . M.S.A. Flame Safety Lamp Test Cabinets . . . M.S.A. Miner's First Aid Cabinets . . . U.S. Army Stretchers . . . M.S.A. Folding Stretcher Outfits . . . M.S.A. Blankets . . . M.S.A. Red-Heat Block Portable Heat Units . . . Permissible Flash Lights . . . Edison Electric Cap Lamps and Hand Lamps. Write for descriptive information.

Write for detailed information on the equipment in which you are interested.

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Whatever you need in piping... valves, fittings, pipe, shop-fabricated units, or pipe line accessories... most likely Crane supplies it. Keep that in mind for a fast start and a good finish on every installation... new or replacement. And for good dependable quality always.

There's a Crane Branch or Wholesaler nearby to give you quick, modern service. One order covers everything you need. From start to finish, every piping job is simplified when you standardize on Crane equipment, because you get this 3-way advantage:

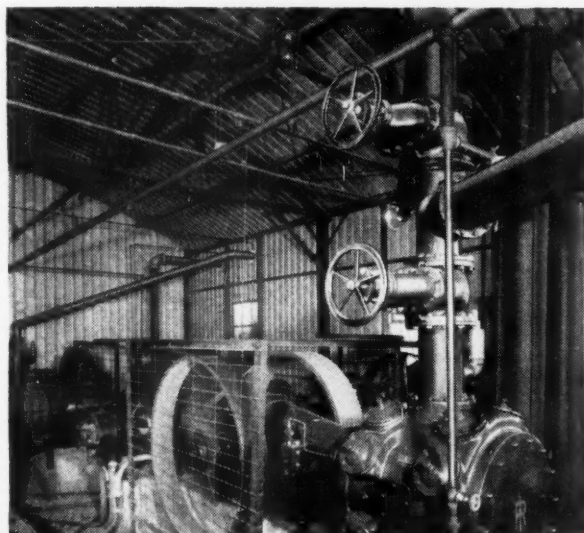
ONE SOURCE OF SUPPLY offering the world's largest selection of steel, iron, brass, and alloy piping materials for all power, process, and general service applications.

ONE RESPONSIBILITY for piping materials—helping you to get the best installation, and to avoid needless delays on the job.

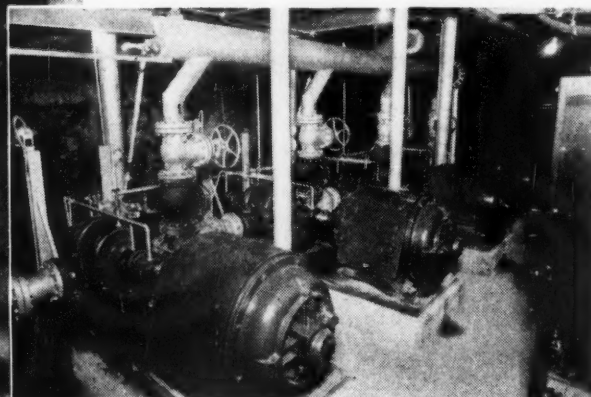
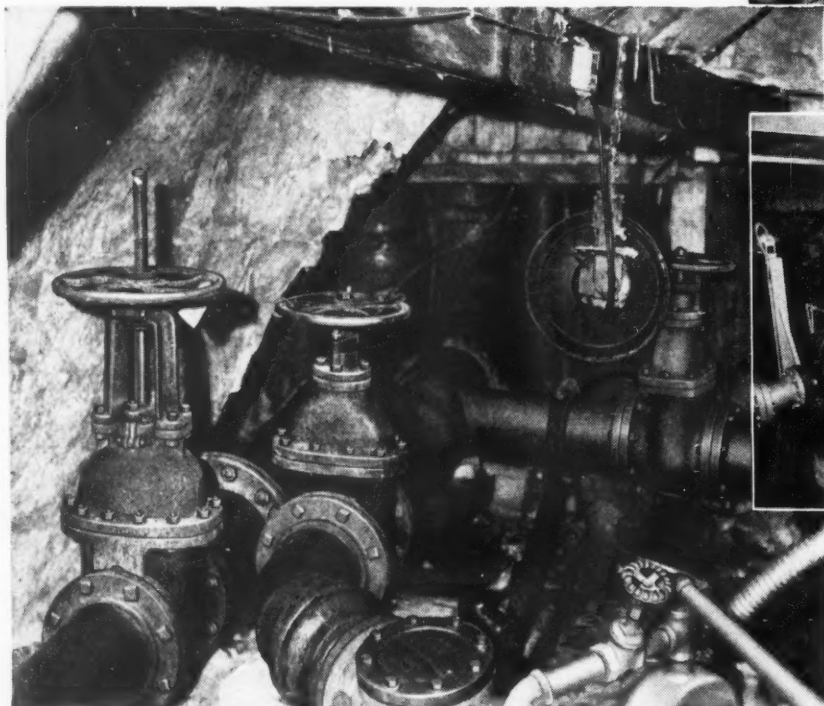
OUTSTANDING QUALITY in every item—assuring uniform dependability and durability throughout piping systems.

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SOURCE OF SUPPLY
RESPONSIBILITY
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FOR AIR COMPRESSOR SYSTEMS, Crane supplies everything in piping... from the largest valve to the smallest fitting.



PUMP ROOM in a lead and fluor spar mine. Piping maintenance is simplified by getting everything from Crane... valves, fittings, and pipe.

DRAINAGE LINES in a metal mine at 1900-ft. level. For dependable control... for proper selection for every need... this mine standardizes on Crane valves and fittings.

EVERYTHING FROM ...

VALVES
FITTINGS
PIPE

CRANE

PLUMBING
AND
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FOR EVERY PIPING SYSTEM

Securityflex Mine Cable

CUTS SHORT CIRCUITS



ANTI-SHORT
BREAKER STRIP

IMPORTANT SAFETY FEATURES

ANTI-SHORT BREAKER STRIP minimizes shorting under tension or compression...anchors jacket to conductor insulation.

FLAME-RESISTANT JACKET with seine twine reinforcing resists abrasion and tearing, is bonded to conductor insulation.

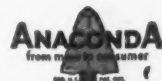
D-SHAPED CONSTRUCTION prevents one conductor riding over the other, eliminates twisting.

SPECIAL, anti-short breaker strip construction and tough, flame-resistant Neoprene outer jacket are your protection against short circuits and overloads when you use Securityflex mine cable. Securityflex will not support combustion... won't kink, twist or tear... stands up under long abuse and severe overloads... assures long, uninterrupted mine service.

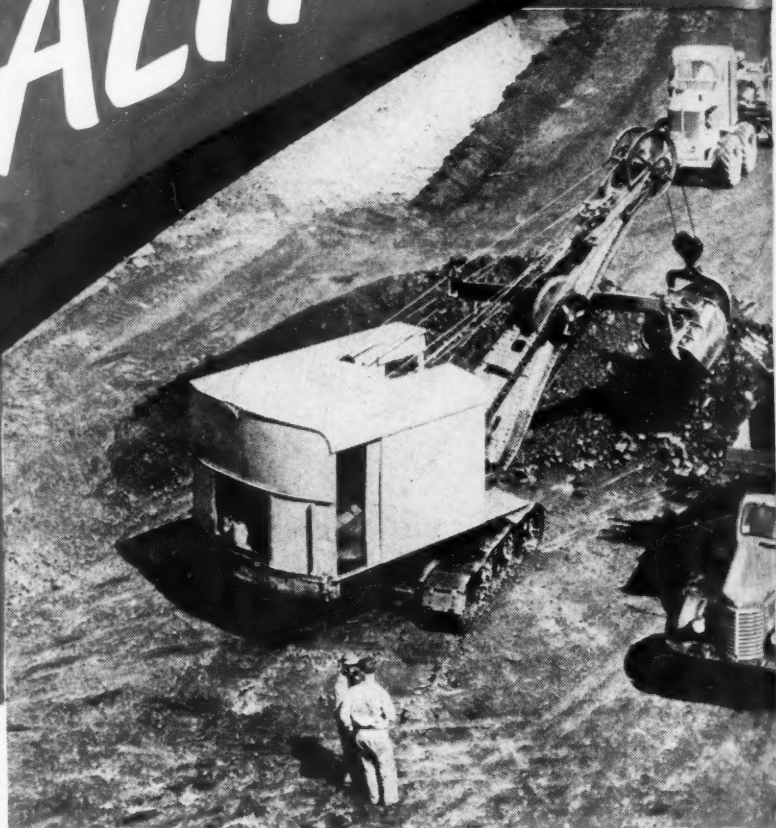
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Securityflex **CABLE**



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Made specially for gasoline-powered
bus, truck, tractor and construction
equipment service . . . where the pull
is hard and steady

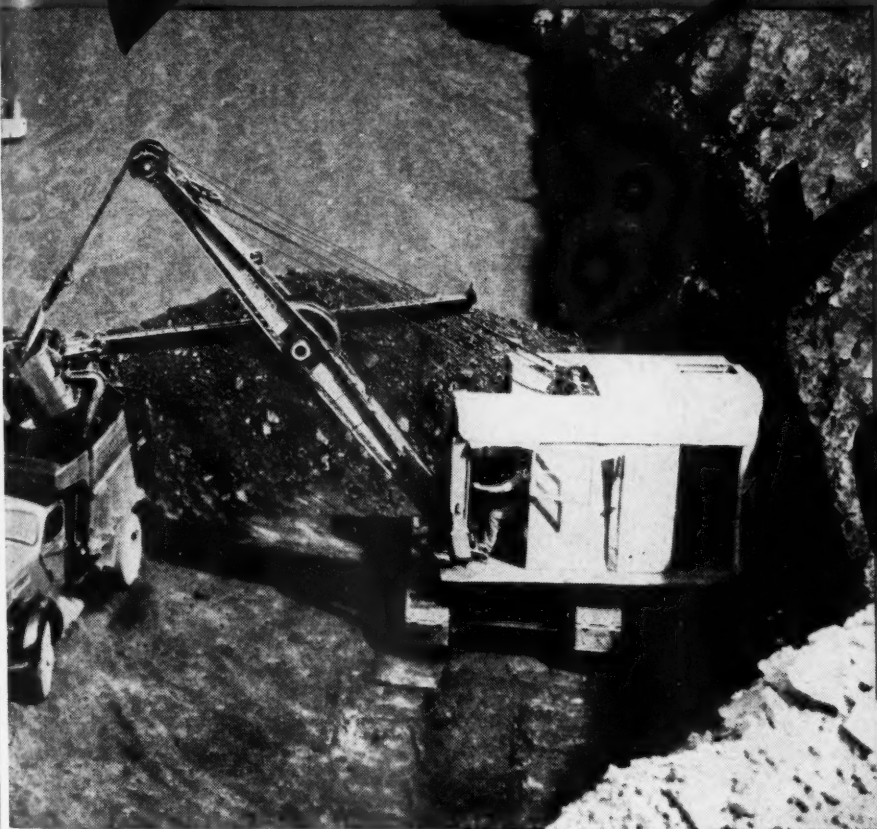
FOR FULL INFORMATION OR LUBRICATION COUNSEL
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SPECIAL REFINING TREATMENT

**TESTED
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**PROVEN
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OPALINE TBT OIL

When heavy load imposes extra demands on engines of trucks, buses, tractors and construction equipment, the motor oil must possess extra qualities.

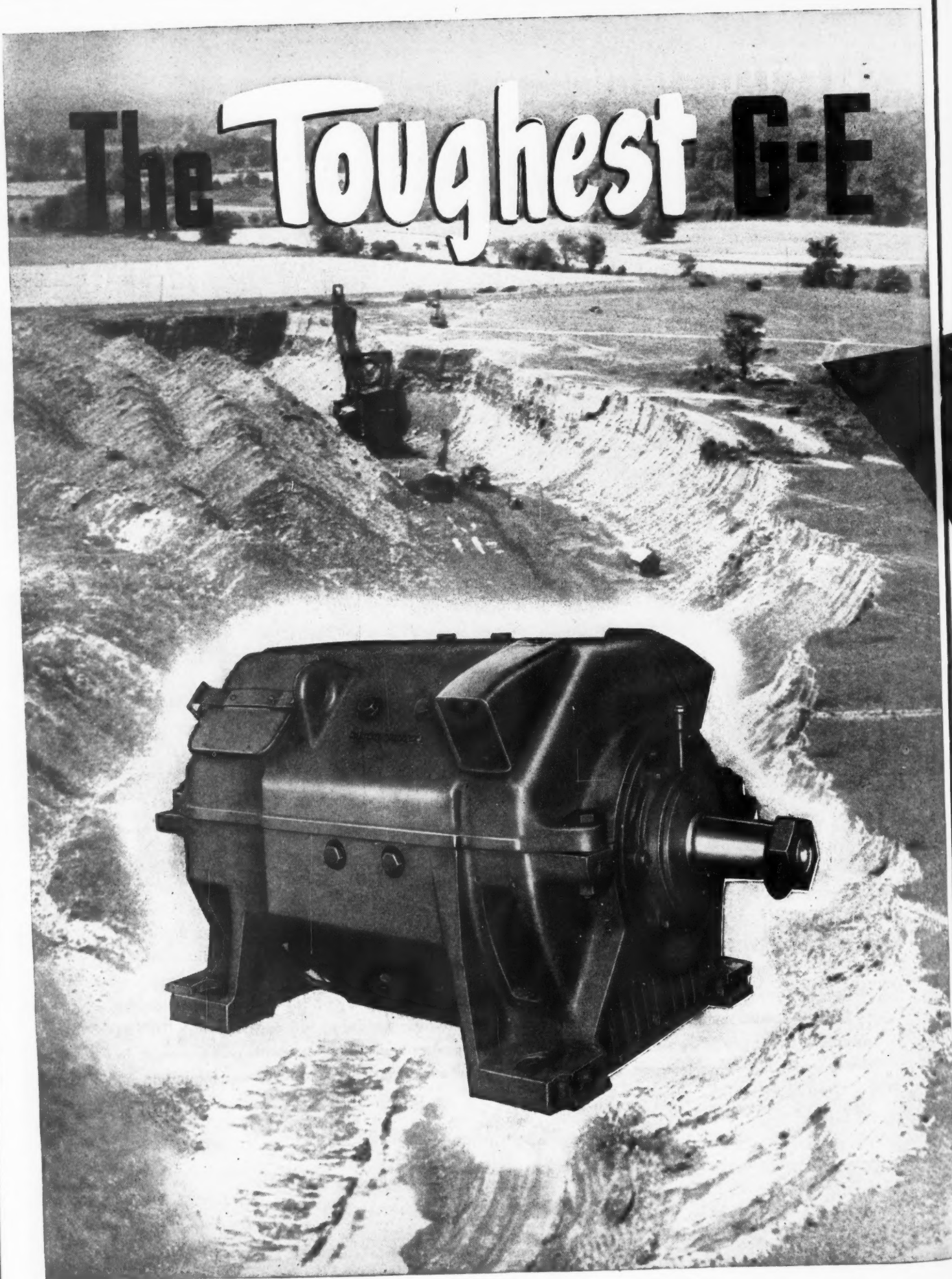
Sinclair OPALINE TBT Oil is made with special additives to fortify it against oxidation tendency under high temperatures, gum, lacquer

and carbon deposits. Special detergent qualities help keep engines clean; inhibitors protect against bearing corrosion and foaming.

An extra-duty oil for extra-duty service. It's made in grades to suit varied engine designs and operating requirements of equipment in the automotive, construction and mining fields.

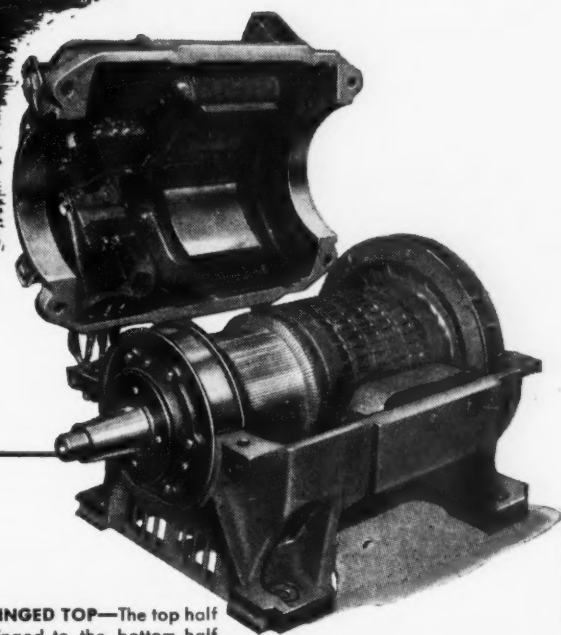
SINCLAIR
AUTOMOTIVE OILS

The Toughest G-E



Shovel Motor Ever Built

- Carries heavier loads safely
- Gives you more horsepower per frame
- Costs less to maintain



The new General Electric MD-600 shovel motor is the strongest, the best electrically balanced, and the most easily adapted shovel motor we have ever offered manufacturers and users of stripping shovels. Its new mechanical and electrical features will mean smoother shovel operation, less maintenance, and lower stripping costs.

The MD-600's frame is sturdier than that of any previous G-E design. The bearings are designed for a wider safety factor and greater capacity. Better commutations at all loads and speeds characterize this new motor. It is lighter and shorter and, most important, it gives you more horsepower per frame size, thanks to new design and insulating techniques.

The new MD-600 is one more good reason for specifying that your next stripping shovel be "General Electric equipped." Bulletin GEA-4654 gives all the details. It's yours for the asking. Write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

● **HINGED TOP**—The top half is hinged to the bottom half in frames 601 to 612 for easy inspection and repair of armature. Because of weight, heavier frames are split, but not hinged.

● **BEARINGS**—Single-width, solid cylindrical roller bearings are used in all sizes. All bearings are protected by dust-proof frameheads.

● **ARMATURE**—Low armature inertia (Wk^2) insures more horsepower output for the job. Lifting bails facilitate removal of the armature.

● **SHAFT**—The entire armature, with commutator, is assembled on a spider—a sleeve of seamless steel tubing or hollow-bored shafting—into which the shaft is pressed and keyed. Thus, the shaft can be pressed out without any disturbance to the commutator or winding.

● **FRAME**—Heavy cast-steel frame withstands severe service. It is equipped with lifting bails and with pads on both ends to mount a G-E brake.

● **BRUSH HOLDERS**—Box-type brush holders are used. All brush-holder supports are doweled and bolted, and are in a fixed position for reversible operation. Easy-to-remove plates and hinged frame make cleaning and repairing of brushes quick jobs.

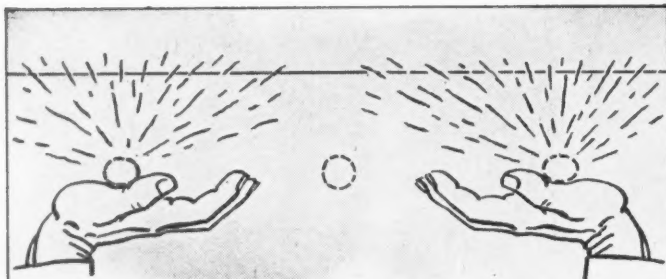
● **UNIVERSAL BEARING HOUSING**—Universal bearing housing accommodates all standard makes of roller bearings without special machining.

● **COILS**—All field coils are heavily insulated throughout with mica and glass. Armature coils are insulated with silicone-binder mica tape, with glass tape for over-all protection.

GENERAL  **ELECTRIC**

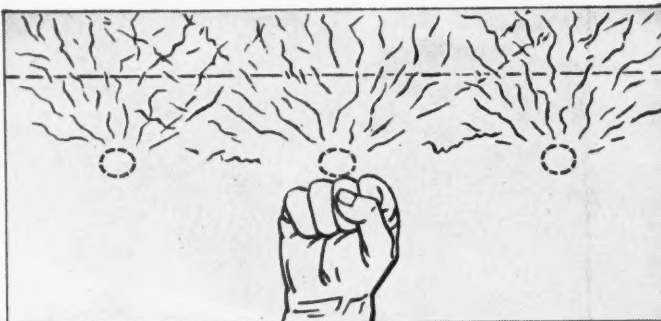
ROCKMASTER BLASTING Is Different!

First It Pushes



Beginning of one type of ROCKMASTER shot. The two outside holes "go" first, placing rock under tension and tending to open up any natural partings in rock and setting up shear planes between holes.

Then It Punches



Second part of ROCKMASTER shot comes milliseconds later, as center hole detonates, taking advantage of first part of blast and doing an unprecedented amount of work.

And What a Difference in Results!

1. More rock ready for the shovel.
2. Better fragmentation—less secondary blasting.
3. Far less "back-break" in quarries. Less pulverizing of coal in strip pits.
4. Minimum noise and vibration—even though more holes may be fired.
5. Wider spacing of drill holes can frequently be used, saving drilling costs and explosives costs.
6. Better control of "throw."

Rockmaster blasting is saving thousands of dollars with results like these in pits and quarries and on construction jobs—wherever it is applicable.

An original Atlas development—the Rockmaster system is tailor-made for each job. Choice of explosives, detonators, spacing and loading—all are considered for your individual requirements.

Call in the Atlas representative today. He will tell you frankly whether Rockmaster can get the same excellent results for you as it does for hundreds of others.

"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

THE GREATER SAFETY OF ATLAS MANASITE DETONATORS

Remember, the Atlas Rockmaster Blasting System also incorporates Atlas Manasite. This means decreased sensitivity to impact and friction—no sacrifice of efficiency but less chance of accident!

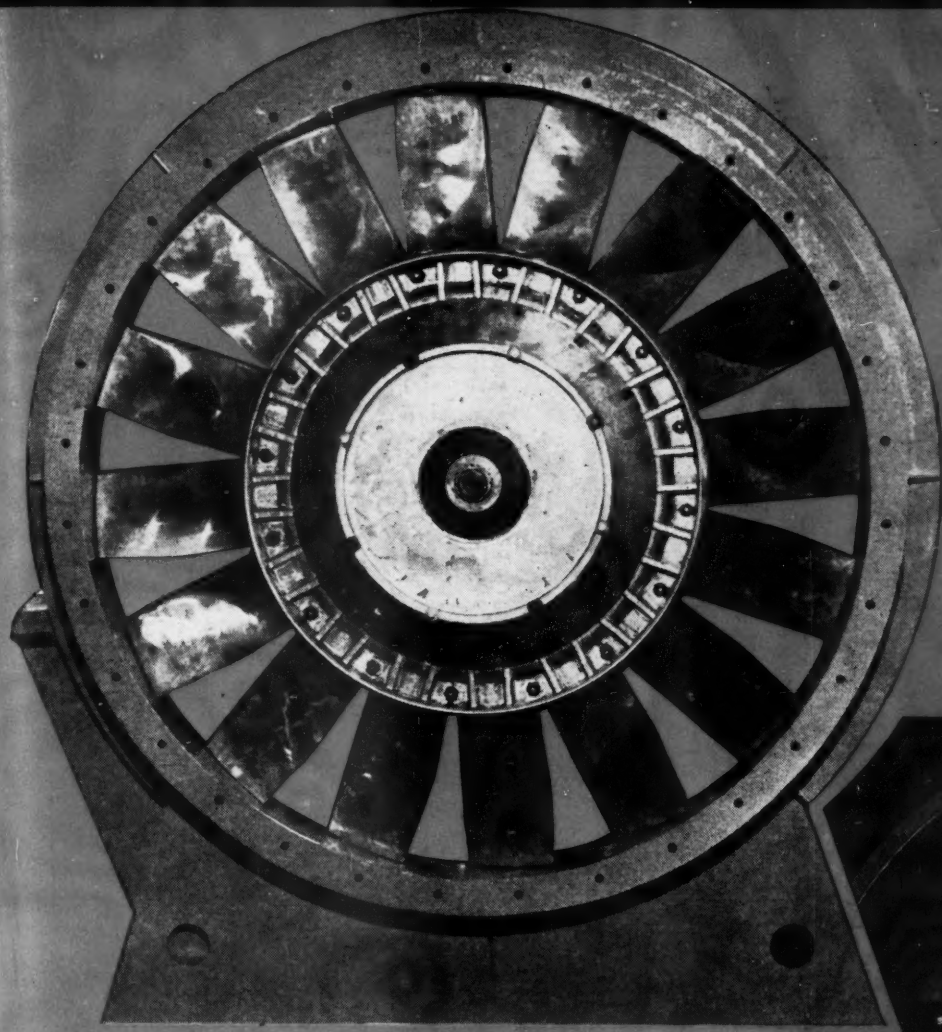


ATLAS

EXPLOSIVES
"Everything for Blasting"

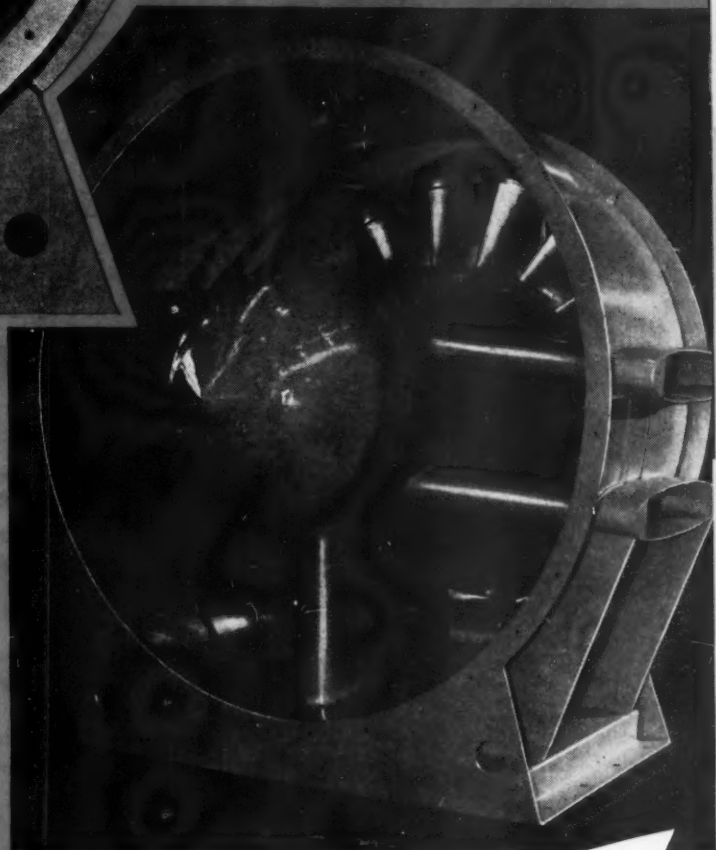


ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco



Blades are interlocking—
simultaneously adjustable—
providing a quick, simple
method of adjustment to meet
changing air demands.

Permanent bearing alignment
assured and foundation work
simplified by a sturdy steel
base which stiffens integral
rotor and housing unit.



LOW OPERATING SPEED

WIDE OPERATING RANGE

QUICK BLADE ADJUSTMENT

EASE OF INSTALLATION

LOW COST MAINTENANCE



*Consult a
Joy
Engineer*

W&O CL 1392

**JOY AXIVANE
MINE
FANS**

*Trolley
designed*

**LA-DEL DIVISION
JOY MANUFACTURING CO.**
GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

NEW!

Superla Mine Lubricants

...improve loader lubrication **5** ways

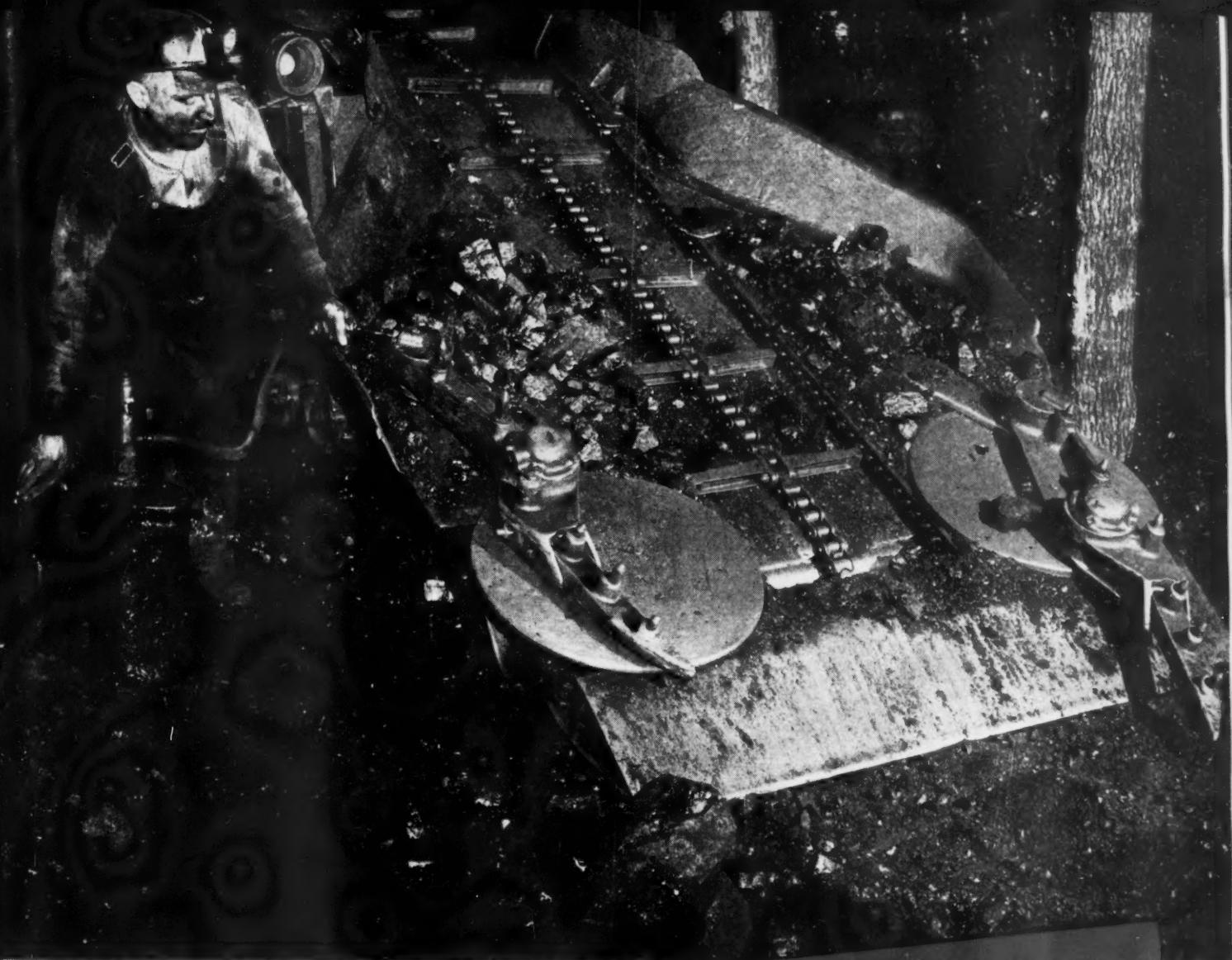
HERE is a new line of 6 cutter and loader lubricants, all of which have been thoroughly tested in mine operation under severest conditions. These lubricants are offered now as solutions to the frequently troublesome and costly problems encountered in keeping mechanized equipment out of the shop and on the job. In addition, they can lighten the operator's job by making machines easier to handle. Higher machine production at lower maintenance cost is the result of five improvements in loader lubrication afforded by Superla Mine Lubricants.

1. **CLEANER OPERATION.** Superla Mine Lubricants resist heat, minimizing deterioration of the lubricant, and the formation of carbon. Cleaner operation with these improved lubricants eliminates a frequent cause of wear.
2. **NO WARM-UP TIME.** Superla Mine Lubricants are fluid at low temperatures. Machine controls operate freely when starting up. This reduces excessive wear by assuring an immediate flow of lubricant to bearings, gears, and clutches.
3. **NO OVERHEATING.** Superla Mine Lubricants do not thin out excessively at machine-operating temperatures. This quality assures proper lubrication of machine parts during long periods of continuous operation.
4. **EASY TO DISPENSE.** Superla Mine Lubricants pour readily from bung-type barrels (except the two heaviest grades which are used only for special loader conditions). They also handle easily in all types of dispensing equipment.
5. **LOW CONSUMPTION.** Superla Mine Lubricants have reduced consumption as much as 15% in severe mine tests.

A Standard Oil Lubrication Engineer will be glad to help you test Superla Mine Lubricants in your machines. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA)

**STANDARD
SERVICE**



Grades for lubricating any type of Cutter or Loader

No. 00. An oxidation-inhibited oil containing a detergent additive. It provides exceptionally clean operation and low oil consumption for oil-lubricated gear cases. Also suitable for loaders with dual systems.

No. 0. A high quality additive type oil similar to No. 00 except that it is a slightly heavier grade. It is designed for loaders with a single oil system.

No. 2. A soft, semi-fluid grease for lubricating gathering-head gear cases where greater fluidity is desired than that usually provided by most loader greases.

No. 4. A semi-smooth grease particularly resistant to thinning out under heat and mechanical working. At the same time it can easily be poured from the barrel bung at ordinary mine temperatures. It is especially designed for Joy loaders.

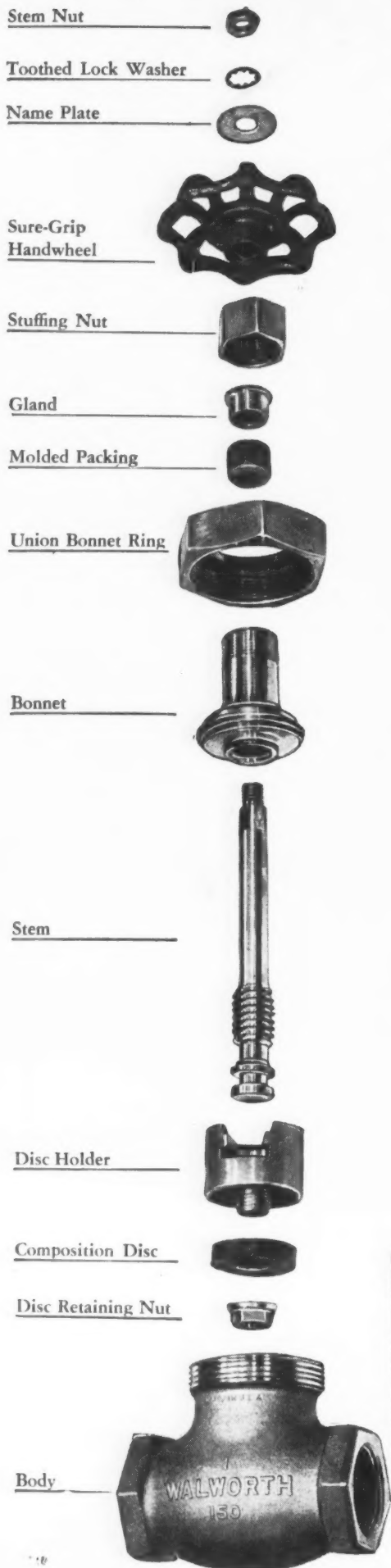
NEW Superla Mine Lubricants

No. 6. A grease of heavy consistency and good high-temperature characteristics. Its fibrous structure makes it particularly adaptable to gathering-head and general underground lubrication.

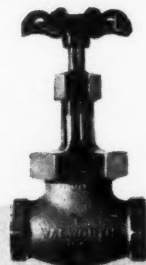
No. 8. A smooth grease having superior high-temperature characteristics. It is suitable for armature bearings and pressure gun work where a grease of heavy consistency is desired. It can be used alone or in combination with No. 6 grade.

STANDARD OIL COMPANY (INDIANA)

**STANDARD
SERVICE**



TO MAKE A GOOD VALVE BETTER



**Walworth has redesigned
and improved its No. 95
Quality Bronze Globe Valve.**

150 pounds working steam pressure at 500F

300 pounds cold water, oil, or gas.

Can be repacked under pressure when fully opened.

The Walworth No. 95 Bronze Globe Valve has always been tops with piping men because they liked these features: Renewable composition disc; lock-on, slip-off disc holder; union bonnet construction; deep stuffing box; tough bronze body made of Composition M (ASTM B61).

Now Walworth has added these improvements: (1) New cylindrical disc holder that accurately guides the disc to the seat, regardless of the position in which you install the valve. (2) Newly designed, air-cooled, sure-grip handwheel that you can grab and turn, even when wearing greasy work gloves. It has a tapered square hole sized to gage to fit snugly on the finished square of the stem. (3) Toothed lock-washer to prevent the stem nut from becoming loose. (4) All parts have been redesigned to give maximum service and strength.

Walworth Quality Bronze Valves are available in Globe (No. 95), Angle (No. 96), or Check (No. 97) types and in sizes from $\frac{1}{4}$ to 3 inches (check valves $\frac{1}{4}$ to 2 inches). Ask your Walworth distributor to show you the improved Walworth No. 95 Bronze Valve, or write for further details.

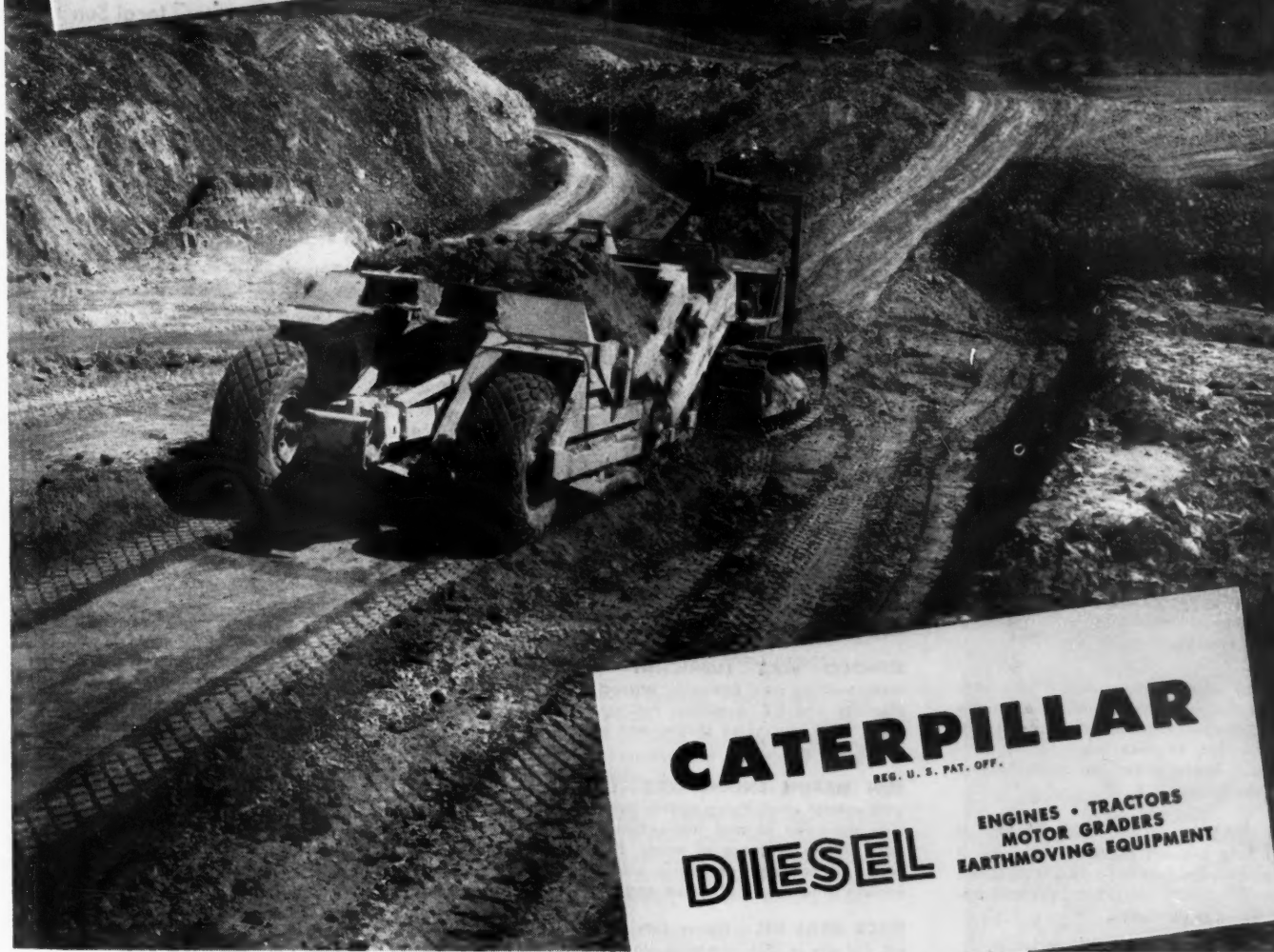
WALWORTH
valves and fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.

**DISTRIBUTORS IN PRINCIPAL
CENTERS THROUGHOUT THE WORLD**

A "Caterpillar" Diesel D7 Tractor with scraper strips overburden at the J. T. Coal Co. mine. Tipple machinery and shovel are also "Caterpillar" Diesel powered.

3 of a Kind...

A Winning Strip-Mine Combination



CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL

ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

The J. T. Coal Co., New Lexington, Ohio, works a three-way "Caterpillar" Diesel parlay to produce 700 tons of coal a day.

The stripping is done by a "Caterpillar" Diesel D7 Tractor and Scraper. The Lorain shovel is powered by a "Caterpillar" Diesel Engine. All power for the tipple is supplied by a "Caterpillar" Diesel D4400, driving a 30-kw generator.

Speaking of the D7, the owners say: "We rate this tractor AA1. As far as we are concerned, 'Caterpillar' Diesels are the only tractors."

And here is further testimony on the engines: "They operate at low cost—minimum bills. And they can be shut down for an indefinite period and started up at once. We are very well satisfied."

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

SUN "JOB PROVED" PRODUCTS CUT COSTS, SPEED PRODUCTION, IMPROVE QUALITY

Proof of the value of any industrial product lies in the experience that practical men have had with it. Sun products have been "Job Proved" in the lubrication of almost every type of mining, manufacturing, power and transportation equipment . . . in refrigeration and air-conditioning . . . in metal cutting, tempering and quenching . . . in the processing of textile fibers, leather, natural and synthetic rubbers . . . in the impregnation of electrical, electronic, and packaging materials of various kinds.

To help you find solutions to problems in any of these fields, Sun Oil Company offers a wide selection of "Job Proved" petroleum products, plus the experience of Sun Engineers. Their know-how and detailed product information are yours for the asking, without obligation. Telephone your local Sun office, or write Dept. CA-1 . . .

SUN OIL COMPANY
Philadelphia 3, Pa.

"JOB PROVED" PETROLEUM PRODUCTS FOR INDUSTRY

SUN INDUSTRIAL OILS

SOLNUS OILS—Well-refined straight mineral oils. Stand up under hard use for long periods of time. Recommended for use in the machine tool industry, in air compressors, certain types of Diesels, etc.

SUNVIS OILS—Are in the same category as Solnus Oils with the difference that, in addition, they meet practically all paraffinic and high V.I. oil specifications.

OCNUS OILS—Low carbon-content oils, containing an additive which minimizes oxidation and gives detergency. Ideal lubricants for internal combustion engines subjected to continuous heavy loads under the most adverse operating conditions.

DYNAVIS OILS—Low pour point inhibited oils which help prevent formation of harmful corrosive and sludge-forming acids. Well-suited for engines fitted with alloy bearings and operated at high temperatures.

SUNTAC OILS—100% petroleum products which have been treated to increase their adhesiveness. Recommended for general lubrication in all industries where sudden shocks and reversal of loads take place. These oils cling to the parts to be lubricated.

CIRCO OILS—Used for general lubrication of industrial machinery when straight mineral oils are required.

SUNISO REFRIGERATION OILS—Have extremely low pour points and long life stability characteristics. Initially neutral and resistant to formation of detrimental acids under service conditions. The most outstanding oils in the refrigerating and air-conditioning fields.

STEAM CYLINDER OILS—High flash and fire point lubricants for either saturated or superheated steam conditions and for worm gear speed reduction units.

SUN CAR JOURNAL OILS—Dark oils meeting A.A.R. Specifications. For use on railroad cars and waste-packed bearings of railroad equipment.

SUN DELAWARE OILS—Dark oils for general lubrication on older type industrial machinery.

SUNOCO WAY LUBRICANT—Has good metal-wetting and adhesive properties, ample viscosity and E.P. qualities. For use on table-ways, as it eliminates chatter and scoring . . . resists corrosion.

SUN MARINE ENGINE OILS—Compounded with special emulsifying agents in order to provide adhesion to and lubrication of working parts in the presence of water. For the lubrication of bearings, eccentrics, cross-heads and various other parts of steam engines.

ROCK DRILL OIL—Heavy-duty adhesive type oil. For use in jack-hammers, stopers and drifters on heavy-duty mining operations.

SUNVIS 900 SERIES TURBINE OILS—High V.I., predominantly paraffinic oils, of uniform 0°F. pour points, containing additives to give high oxidation stability and corrosion resistance under practical operating conditions. Modern oils for turbine and hydraulic systems.

SUN INDUSTRIAL GREASES

SUN CUP GREASES—Water resistant. For grease cup and grease gun application when the service is not severe.

SUN GUN GREASES—Smooth greases made with medium viscosity oil. Stable under pressure in power guns or booster guns.

ADHESIVE PRESSURE GREASES—Won't drip or splash and are excellent lubricants for open gear applications.

SUN DARK PRESSURE-SYSTEM GREASES—For power-driven central grease lubricating systems in heavy industries. Can also be used as a "medium cup grease."

SUN MINE CAR GREASES—Available in several grades. Suitable for both anti-friction bearings and plain bearing cavity-type wheels.

SUN ROLLER BEARING GREASES—For use on electric motors and generators and other high-temperature machinery equipped with ball or roller bearings.

SUN GEAR COMPOUNDS—Black adhesive open gear compounds and wire cable greases. Recommended for open gears on metalworking power presses, mining machinery, old reduction mills, crushers, pump gears, etc.

SUN MINING MACHINE LUBRICANT—Semi-fluid. For use where a light but adhesive type grease is required. Free from separation or decomposition.

SUNOCO TRACTOR ROLLER COMPOUND—For miscellaneous parts of caterpillar or crawler-type tracks. Provides good lubrication with exceptional sealing qualities.

SUN METALWORKING OILS

SUNICUT—Straight or non-emulsifiable transparent cutting oils. Recommended for automatic screw machines and for heavy-duty machining operations.

SUN INDUSTRIAL



SUNOCO EMULSIFYING CUTTING OIL—A self-emulsifying oil which produces a stable white emulsion when mixed with water. Sunoco is an efficient and economical cooling and lubricating medium for turning, milling, drilling, and other metalworking operations on both ferrous and non-ferrous metals. It is also an excellent grinding coolant.

SUN QUENCHING OILS—Specially refined oils designed to develop maximum physical properties in a wide variety of steels.

SUN TEMPERING OILS—Specially refined oils for tempering steel up to 550°F. Due to their low carbon content and stability under heat, these oils have an unusually long service life.

SUN ROLLING OILS—Straight and emulsifying oils which will permit maximum production in rolling steel, aluminum and brass.

SUN ANTI-RUST COMPOUNDS—Petroleum base oils with chemical additives designed to prevent the rusting and corrosion of steel.

SUN PROCESSING OILS

SUNOTEX TEXTILE OILS—Designed to impart certain additional properties to various forms of fibers during their processing from the fiber state into a manufactured product. All Sunotex textile oils are emulsifiable in water.

SUN COTTON CONDITIONING OILS—Pale mineral oils which condition the cotton. They prevent waste by cutting down excessive amounts of "fly" or fine air-borne particles of lint.

SUN ASBESTOS FIBER CONDITIONING OIL—Used for spraying on the asbestos during processing. Fibers are not so readily damaged or broken down into harmful dust when this product is used.

SUN CORDAGE OILS—Are adaptable in various formulae used by cordage manufacturers. They are selected products which are highly compatible with additives.

CIRCOSOL—2XH (Rubber Processing)—An elasticator and processing aid for GR-S particularly.

CIRCO LIGHT PROCESS OIL (Rubber Processing)—A processing aid and excellent softener for natural rubber, natural rubber reclaims, and neoprene synthetic rubber particularly. Used for GR-S to some extent.

SUNDEX 53 (Rubber Processing)—An inexpensive product suitable for processing GR-S and blends of GR-S and natural rubber. An established outstanding processing aid for footwear rubber stocks.

CIRCOMAR-5AA (Rubber Processing)—A black colored product used in reclaiming natural rubber scrap. Used also as substitute for asphalt fluxes in processing natural and GR-S rubber. Free-flowing at room temperature.

SUN LEATHER OILS—Mineral base leather oils. Used for obtaining the desired tensile strength, proper temper and a controlled moisture content. They maintain a light even color . . . mix well . . . distribute evenly.

SUN MISCELLANEOUS INDUSTRIAL PRODUCTS

SUN SPIRITS—For the thinning of paints, varnishes, and enamels. Also for metal cleaning. This product is a pure water-white petroleum solvent and is free of corrosive sulphur.

SUN WAXES—Used in packaging, sealing, coating, waterproofing and for numerous manufacturing and chemical processes.

RUBBER MANUFACTURER saved \$3,000 a year with a Sun Processing Aid.

ALUMINUM PARTS MANUFACTURER increased output 43 % with Sun Cutting Oil.

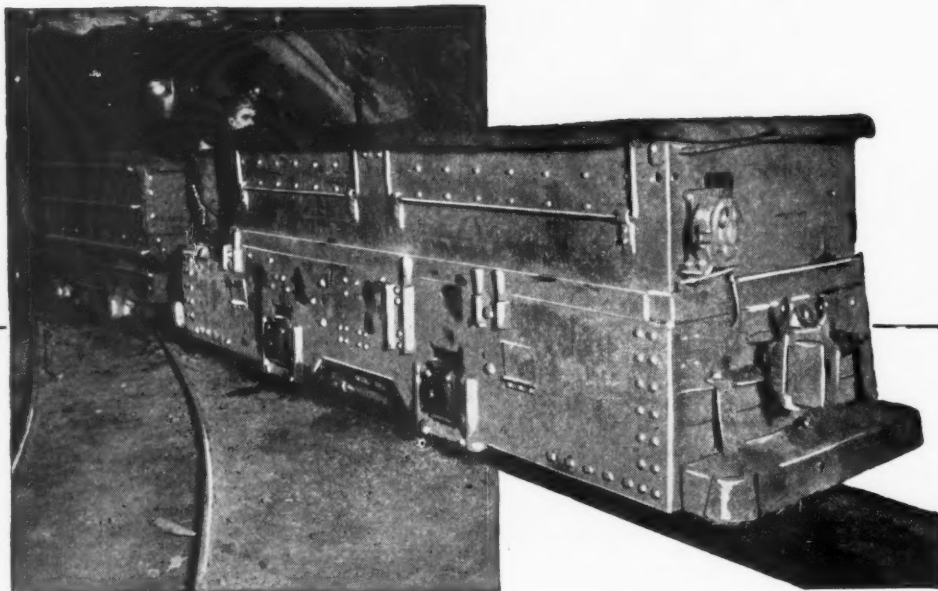
PAPER MILL slashed annual lubrication bill \$2,874 by using a Sun Grease.

POWER PLANT found Sun Diesel Lubricant lasted 50 % longer.

A TEXTILE MILL increased slashing speed 60 % by adopting a Sun Processing Oil.

PRODUCTS

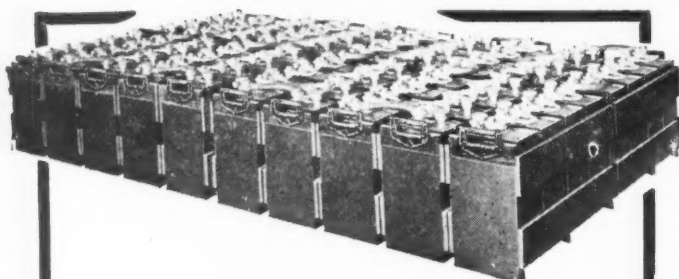




Do you get...

EXTRA SERVICE from "retired" Batteries?

After an EDISON Nickel-Iron-Alkaline Battery has delivered its normal service life in a locomotive or shuttle car and has to be replaced because the battery is no longer of sufficient capacity for the work, its cells, instead of being scrapped, are often regrouped into other batteries for lighter-duty uses for which their capacity is still ample.



In Mine Locomotive and Shuttle Cars EDISON Nickel-Iron Alkaline Batteries Give You These Important Advantages

- ★ They are **durable mechanically**; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- ★ They are **foolproof electrically**; are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- ★ They can be **charged rapidly**; do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- ★ They **withstand temperature extremes**; are free from freezing hazard; are easily ventilated for rapid cooling.
- ★ They can **stand idle indefinitely** without injury. Merely discharge, short circuit, and store in a clean, dry place.
- ★ They are **simple and easy to maintain**.

FREE ADDITIONAL POWER —

The electrical departments of a number of mines have been doing just that; in effect getting new batteries free which, in various stand-by jobs, often give many more years of dependable performance. The fact that nickel-iron-alkaline batteries can do this is a good illustration of their unequalled dependability on the original job.

The reasons are few and simple: steel cell construction; an alkaline electrolyte that is a natural preservative of steel; a principle of operation free from self-destructive reactions. Because of their long life, simple maintenance, and trouble-free characteristics, EDISON Nickel-Iron-Alkaline Batteries also help cut haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Company, Limited, Montreal and Toronto.*

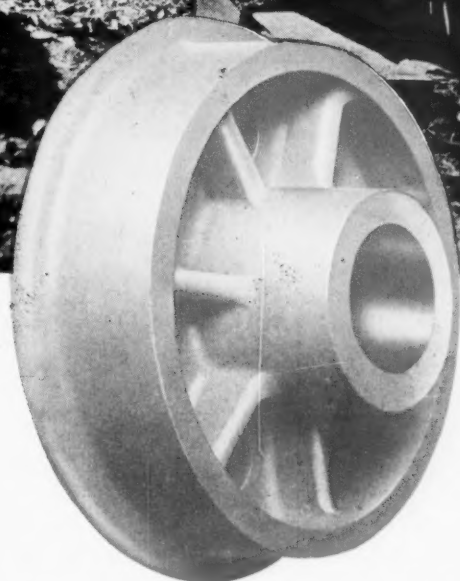


EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES



It Pays to *Check* ✓
your **MINE CAR WHEELS**

WORN TREADS
"FLATS"
WORN FLANGES
Slow Down Coal Output!



A.C.F. Chilled-Tread wheels give those "extra miles" of wear, less friction on the rails which enable you to start and haul heavier loads at higher speeds.

It's the controlled heat treatment in the manufacturing process that makes the difference. A.C.F.'s wide experience in wheel design insures the proper proportion of metal in the tread and flange, hub and plate. This assures maximum strength and durability where needed.

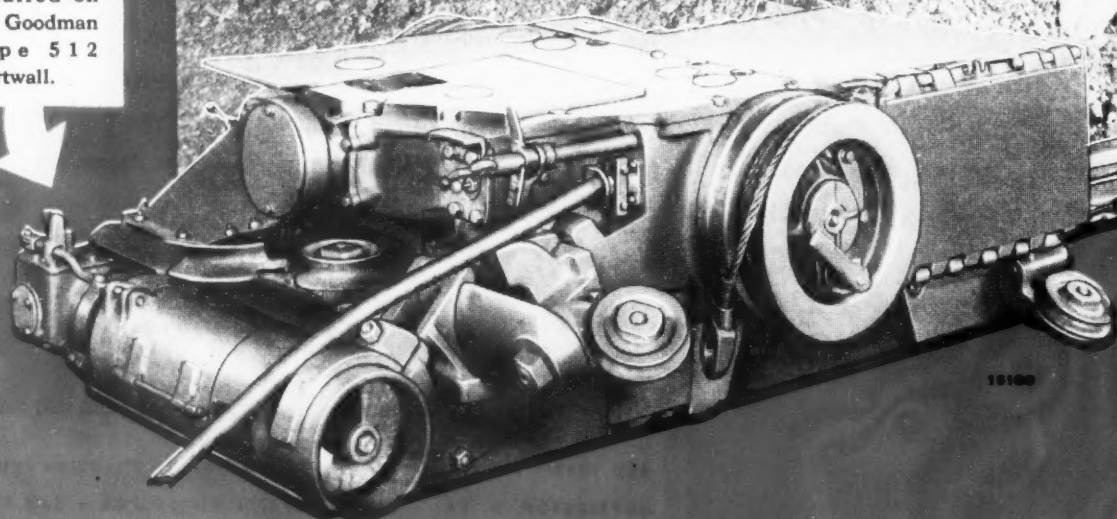
Mine car wheels are a vital part of a smooth-rolling transportation system. Check them today! Replace worn equipment with scientifically-designed A.C.F. wheels. Our Sales Representatives will be pleased to discuss any of your transportation prob'ems



MINE CARS

NEW YORK • CHICAGO • CLEVELAND • WASHINGTON • ST. LOUIS • PHILADELPHIA
HUNTINGTON, W. VA. • BERWICK, PA. • PITTSBURGH • SAN FRANCISCO

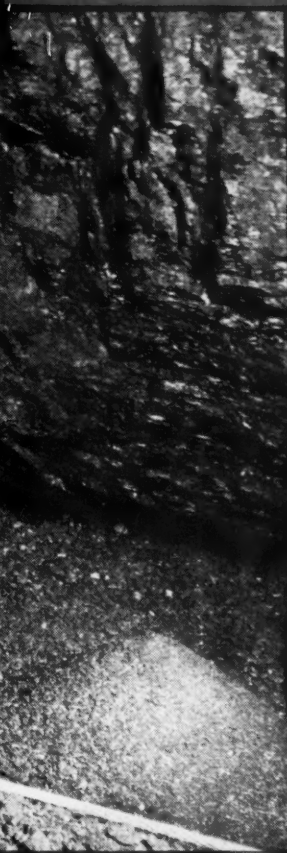
The Bug-
duster can be
installed on
any Goodman
Type 512
Shortwall.





SHOVELING DAYS ARE OVER . . .

in mines where Goodman Type 512 Shortwalls equipped with Bugduster do the undercutting. Slack is swept into the Bugduster and forced out into the bottom of the row that forms to the right of the machine . . . *back from the face*. The machine helper is freed for other duties at the face, dust is eliminated, the kerf is left clean.



10148

GOODMAN MANUFACTURING COMPANY

HALSTED STREET AT 48TH

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CHICAGO 9, ILLINOIS

CARDOX

THE NON-EXPLOSIVE MINING METHOD

THESE 171 OPERATORS *Are Now Using* THE NON-EXPLOSIVE MINING METHOD

WEST VIRGINIA

American Coal Company (3)*
 Algoma Coal and Coke Company (2)
 Ames Mining Company
 Alaska Coal Co.
 Brule Smokeless Coal Company
 Canyon Coal and Coke Company
 Clear Creek Coal Company
 Crozer Coal and Coke Company
 Delmont Fuel Company
 Elk River Coal and Lumber Company
 Gay Mining Company
 Gulf Mining Company
 Hutchinson Coal Company (2)
 Hoylman Coal Company
 Imperial Smokeless Coal Company
 Jacobs Fork Pocahontas Coal Company
 Katherine Coal Mining Company
 Koppers Coal Div., Eastern Gas & Fuel Associates (4)
 Leckie Smokeless Coal Company
 Milton Coal Company
 Minds Coal Mining Corporation
 Pardee and Curtin Lumber Company (4)
 Pecks Run Coal Company
 Premier Pocahontas Collieries
 Princess Dorothy Coal Company
 Raine Lumber and Coal Company
 Raleigh-Wyoming Mining Company
 Red Jacket Coal Corporation
 Rupert Smokeless Coal Co.
 Richwood Sewell Coal Co.
 Scotia Coal and Coke Company
 Slab Fork Coal Company
 South Side Company
 Standard Fire Creek Coal Company (2)
 Sycamore Coal Co.
 Truax-Traer Coal Company
 United Pocahontas Coal Company
 West Gulf Coal Co.
 Weyanoke Coal and Coke Company
 Winding Gulf Collieries
 Wood Coal Company
 Wyoming Mining Corporation

VIRGINIA

Blackwood Fuel Company, Inc. (2)
 Buchanan County Coal Corporation (2)
 Coal Processing Corporation
 Jewell Ridge Coal Corporation (2)
 Page Pocahontas Coal Corporation
 Panther Coal Company
 Red Jacket Coal Corporation
 Sycamore Coal Corporation

KENTUCKY

Bell Coal Company
 Big Jim Coal Company
 Blue Bird Mining Company
 Cinderella Coal Corporation
 Creech Coal Company
 W. G. Duncan Coal Company
 Elkhorn Coal Company
 Fourseam Coal Company
 Harvey Coal Corporation
 Knott Coal Corporation
 Marlowe Coal Company
 Kentland Elkhorn Coal Co.
 Smith Coal Co.
 Stoker Coal Company
 Utilities Elkhorn Coal Company

TENNESSEE

Straight Fork Coal Company

PENNSYLVANIA

Butler Consolidated Coal Company
 Charles E. Campbell
 Millerstown Coal Company
 Moffit Coal Company (7)
 Pittsburgh Coal Company
 Pittsburgh Consolidation Coal Co.
 Edward Tomaiko
 Washington Coal Company
 Westmoreland Coal Company (2)

*INDICATES NUMBER OF MINES USING
THE NON-EXPLOSIVE MINING METHOD

CARDOX CORPORATION

ANNUAL *Roll Call*

OHIO

Hanna Coal Company of Ohio
The Hocking Valley Mining Company
Midvale Coal Company
Warner Collieries Company.....(2)

ILLINOIS

Bell and Zoller Coal and Mining Co.....(4)
Blue Bird Coal Company.....(2)
Bugos-White Coal Co.
Chicago Wilmington & Franklin Coal Co.
The Consolidated Coal Company.....(3)
Dering Coal Company
Franklin County Coal Corporation
Edward Mohn & Son
Freeman Coal Mining Corp.
Macweir Coal Corp.
Moffat Coal Company.....(5)
Old Ben Coal Corporation.....(5)
Peabody Coal Company.....(3)
Peschirrer & Sons Coal Co.
Sahara Coal Company
Sparta Coal Company
Truax-Traer Coal Company
Turner Coal Corp. of Delaware
Union Colliery Company

INDIANA

Black Hawk Coal Corporation
Chesser Coal Company
Glendora Coal Company
Ingle Coal Corporation.....(3)
Knox Consolidated Coal Corporation
Linton Summit Coal Co.
Princeton Mining Company
Pyramid Coal Corporation
Rudolph Oil and Coal Company
Standard Coal Company
Snow Hill Coal Corp.
Templeton Coal Company
Three Coal Co.
Walter Bledsoe & Co.

IOWA

Shuler Coal Company

OKLAHOMA

Buck Creek Mining Company
Bokoshe Coal Co.
Davis & Swindle Coal Co.
Heather Coal Co.
Reliance Smokeless Coal Company

COLORADO

Black Diamond Fuel Company.....(3)
Boulder Valley Coal Company.....(2)
Canon Black Diamond Coal Company
Canon Monarch Coal Company
Calumet Fuel Co.

Clark Coal Co.
Canon National Coal Company.....(2)
Clayton Coal Company.....(3)
Colorado Fuel & Iron Corporation
Colowyo Coal Company
Consolidated Coal & Coke Company
W. D. Corley, Jr.
Cribbs-Goodman Coal Company
Domestic Coal Company
Double Dick Coal Company
Dry Creek Coal Company
Giuliano and Sons Coal Company
Graden Coal Company
Griffith Coal Mining Company
Hayden Coal Company
Imperial Coal Company
Jaunita Coal & Coke Co.
Keystone Coal Company
Liley & Merlino
Louisville Lafayette Coal Co.
Louisville Coal Corporation
McNeil Coal Company
National Fuel Company
Oliver Coal Company
Royal Gorge Coal Company
Taylor Coal Mining Company
Tomahawk Coal Co.
Vento Coal Company.....(2)
Victor-American Fuel Company.....(2)
William E. Russell Coal Company

MONTANA

Jeffries Coal Company
Johnson Coal Company
Divide Coal Co.
Roundup Coal Mining Company
Western Coal Co.

WYOMING

Burnell Coal Mines
Colony Coal Company
Gildroy Coal Co.
Rock Springs Fuel Co.
Sheridan-Wyoming Coal Company.....(2)
Storm King Coal Co.

UTAH

Spring Canyon Coal Company
Uta-Carbon Coal Company

CANADA

Lethbridge Collieries, Limited
The Monarch Coal Mining Company, Limited
Regal Coal Company, Ltd.
West Canadian Collieries, Ltd.....(2)

MEXICO

American Smelting & Refining
NEW MEXICO
St. Louis, Rocky Mountain & Pacific Co.....(2)

CARDOX

HARDSOCC

DRILLING EQUIPMENT

Complete line of drilling equipment designed
to give you the maximum in drilling efficiency.

• BELL BUILDING • CHICAGO

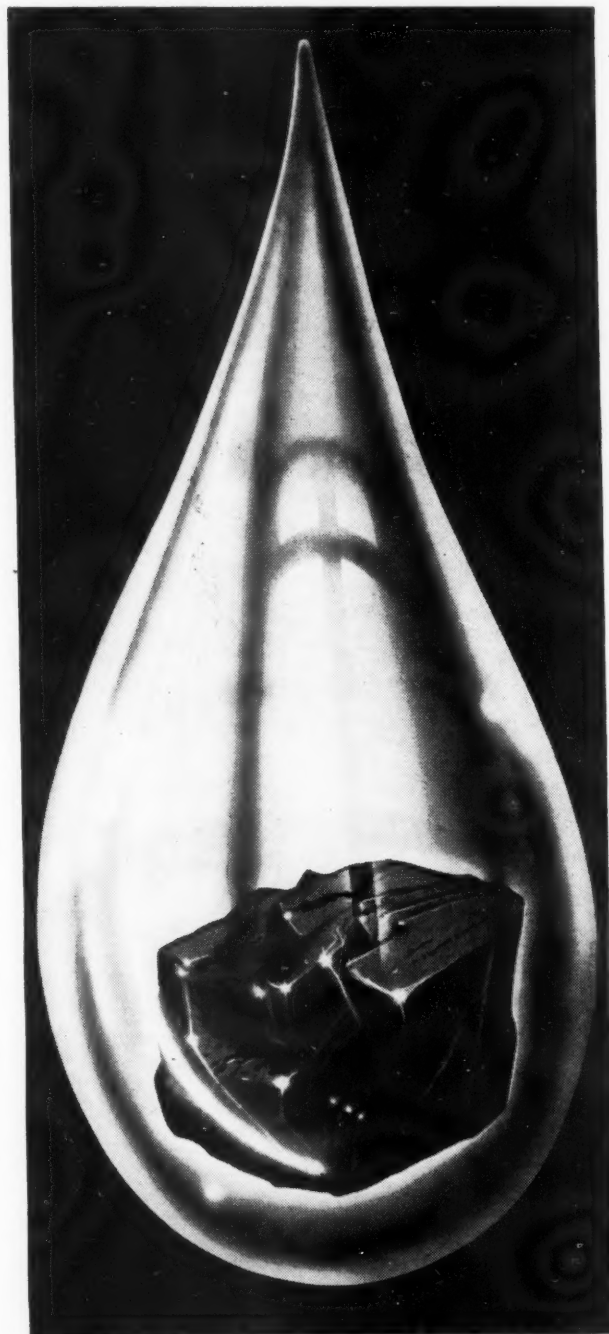
Ashland

PERMATREAT COAL SPRAY

Seals in Dust

1. GIVES BETTER COMBUSTION
WITH DUST-SEALED COATING
2. STOPS WINDAGE LOSS IN
TRANSIT
3. FEEDS EASIER IN STOKERS
4. INSURES ALL-AROUND BETTER
HANDLING

Sealed-in dust holds inherent moisture in each lump of coal, gives better combustion in the fire box. Coal is more easily handled when there are no dry flying dust particles — an advantage to mine operators, dealers, consumers. Dust particles sealed to coal lumps are combustible — burn with the coal. Customers burn **BETTER** fuel, **ALL** the fuel, are better satisfied. For more information, write our Coal Spray Division.



ASHLAND OIL & REFINING COMPANY
ASHLAND, KENTUCKY



ERIEZ Permanent Non-Electric Magnetic Pulleys and plates are being efficiently used to protect coal preparation equipment from tramp iron damage.

The Eriez Magnetic Pulley, used as a head pulley in belt conveyors, and Eriez "GIANT" plate separators installed in chutes ahead of washers, crushers, pulverizers, etc., provide a simple solution for tramp iron removal. Easy to install, economical and powerful, these units designed specifically for cleaning coal have been thoroughly field tested . . .

Eriez Permanent Magnetic Separators can be used under the most severe operating conditions . . . Powered by special giant alnico magnets they require no outside source of power . . . Heat, cold or moisture does not affect their operating efficiency . . .

Eriez Non-Electric Magnetic Equipment is reducing mine operating costs and keeping customer goodwill by protecting processing equipment from damage, recovering expensive tools, and improving quality of coal . . . Your magnetic protection is positive and **PERMANENT** when you specify ERIEZ.

CLIP AND MAIL TODAY —
Please send bulletin No. 102B

We would like to know more about installation of ERIEZ on:

- ☐ Gravity Conveyors ☐ Mechanical Conveyors
☐ Equipment on Processing Machines

CA-1

Name _____
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● *When It's Magnetic Protection . . . See Eriez First*

Eriez Magnets Are
Engineered to Fit
Your Equipment.

Eriez
EAR'EEZ

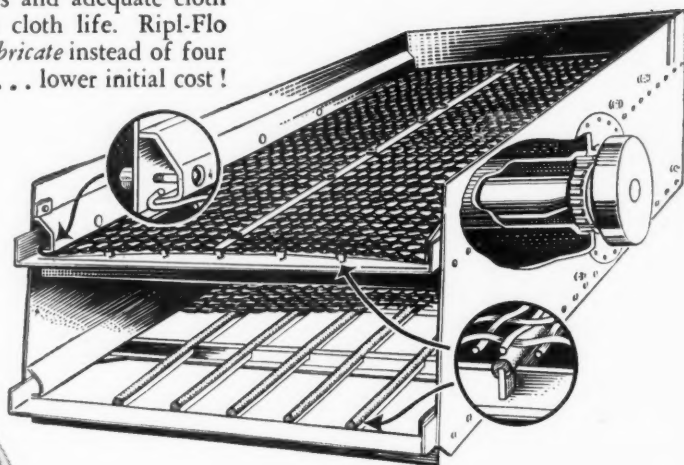
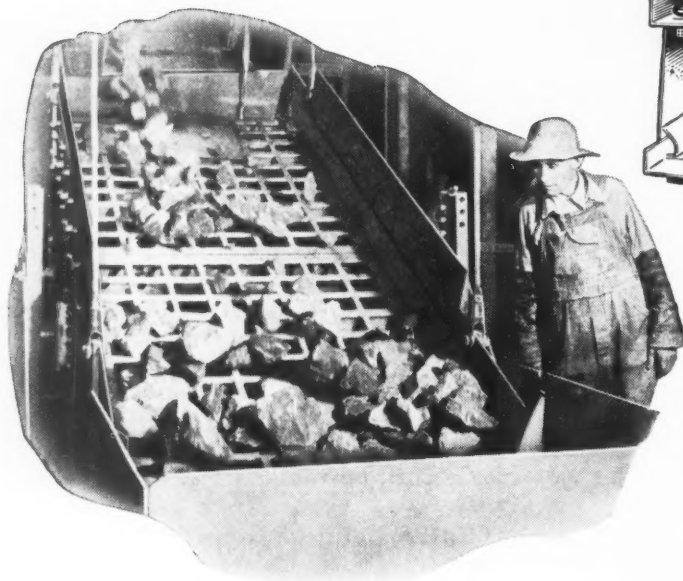
ERIEZ MANUFACTURING CO.

60 EAST 12th ST. ERIE, PENNA.



"Two Main Things I want to know about Any Vibrating Screen!"

1. HOW IT'S BUILT: Take a close look at Ripl-Flo screen if you want to see long-life construction! Made of high strength alloy steel with all welded parts "stress-relieved" for durability. Accurately crowned support frames and adequate cloth supports greatly increase screen cloth life. Ripl-Flo screen has only *two bearings* to lubricate instead of four — less weight and maintenance . . . lower initial cost!



2. HOW IT WORKS: If you could watch a Ripl-Flo screen run, you'd see a very rapid stratification and an *even* bed depth of material. Eccentric mechanism imparts a *balanced* circle throw motion to *every part* of screen surface. Every Ripl-Flo screen is tested before shipment for correct balance, throw, bearing temperature. You can change screen surfaces easily . . . because clamping plate adjustment is located *outside* of screen body!

• Ripl-Flo vibrating screens are built by Allis-Chalmers in 15 sizes from 3 x 6 to 6 x 16 ft, with one, two or three decks. Their use has resulted in *more profitable operations* in screening a wide range of materials. Send for Ripl-Flo Bulletin 07B6151B. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2375

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SCREENS**

*Combine Sound Engineering
with Proven Performance!*

Ripl-Flo is an Allis-Chalmers Trademark

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products





Kennametal Bits Reduce Cutting Cost

5¢ per ton

for a Southern West Virginia Producer

- Five cents a ton lower cutting cost per ton of coal was the startling fact revealed in a cutting test, Steel versus Kennametal, at a mine of a Southern West Virginia producer.
- Nearly 3,000 tons of coal were mined during the test. Time study figures show that the amount of money saved in labor cost to change bits alone amounted to more than four times the initial cost of Kennametal bits.
- To be exact, \$131.23 was saved in the labor cost while 2721 tons of coal were cut. Bit changing cost according to the mine official in charge of the test was: Steel bits—\$139.74; Kennametal—\$8.51.
- The test not only revealed that the labor cost of changing and resetting bits was a major factor in preparation cost, but also it brought out six other big advantages of Kennametal bits:
 1. Lower power cost.
 2. Less cost for sharpening.
 3. Lower cost for transporting bits to and from the mine.
 4. Coarser slack; more stoker.
 5. Less maintenance on the machine.
 6. And most important—the ability of the cutting machine to stay ahead of the loader.

Aside from showing an appreciable mining cost difference, the test proved that by stepping up the pace of other mining machinery, more coal could be mined per shift.

We will be glad to give you the complete story. Write for Bulletin MM-90, Mining Division, Kennametal Inc., Latrobe, Pa.

COMPARATIVE PERFORMANCE RESULTS ➡	Conventional Bits	Kennametal Bits
Sq. ft. of Kerf cut per min.	10.24	10.84
Sq. ft. of Kerf cut per bit before resharpening	3.69	60.60
K.W.H. per sq. ft. of Kerf (actual cutting time)	0.0664	0.0490
Sq. ft. of Kerf cut per set of bits before resharpening	121.77	2000.00
Life of bits per set expressed in tons of coal cut.	199.00	2721.00
Initial cost of bits per set.	\$1.15	\$31.35
Labor cost of changing bits per 2721 tons of coal cut.	\$139.74	\$ 8.51
Initial cost of bits per ton of coal cut.	\$0.0058	\$0.0115
Labor cost of setting sharp bits per ton of coal cut.	0.0513	0.0031
Labor cost of resharpening bits per ton of coal cut.	0.0173	0.0095
Total cost of using each type of bit per ton of coal cut.	\$0.0744	\$0.0241
SCREEN ANALYSIS of CUTTINGS		
1 1/4" Plus.	1.05%	1.39%
1 1/4" x 3/4"	8.66	4.99
3/4" x 1/2"	12.86	14.13
1/2" x 1/4"	22.05	26.59
1/4" x 0"	55.38	52.90
	100.00%	100.00%

KENNAMETAL

THE WORLD'S LARGEST MANUFACTURER OF CEMENTED CARBIDE MINING TOOLS

How Hard is Kennametal

Scientists say that Kennametal is as hard as sapphire, and in the class of shock-resistant hard materials it is exceeded in hardness by the diamond only. The geologist hardness table rates Kennametal at 9.2 and the diamond at 10.

This one feature of Kennametal helps to explain why it is one of the most revolutionary and one of the most quickly accepted products that has ever been used in coal mining.

High Speed

TOURNADOZER

Faster Dozing

*Compare
cycle time
... figure
production*

TOURNADOZER gives you double the average dozing speed forward . . . three times more speed in reverse. In addition, instantaneous speed selection saves up to 10 seconds every time you shift gears. Big rubber tires and 15 m.p.h. top speed get Tornadozer anywhere on your job in a hurry. Fast, self-powered job-to-job moves over pavement reduce your non-productive move time . . . eliminate expensive hauling and planking charges. Tornadozer enables you to get more work done at lowest net cost. Mail coupon at right for complete facts. **DO IT NOW!**

Increased speed plus instantaneous

**DOZING
SPEED**

TOURNADOZER 3 m.p.h.



**CRAWLER-DOZER
1.5 m.p.h.**



Figures at left show average dozing speeds of crawler-type dozers, as published in War Department technical manual TM5-252.

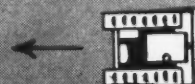
**SHIFTING
TIME**

Tornadozer can travel 100 feet at return speed of 7 m.p.h. while tractor spends 10 seconds shifting gears.

**RETURN
SPEED**



TOURNADOZER 7 m.p.h. (av.)



**CRAWLER-DOZER
2.5 m.p.h. (av.)**



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NOW for complete information**

R Gives You g Cycles

AND MAIL TODAY

R. G. LeTOURNEAU, INC., Peoria 3, Illinois

☐ Send facts on 180 h.p. "C" Tornadozer

NAME

COMPANY

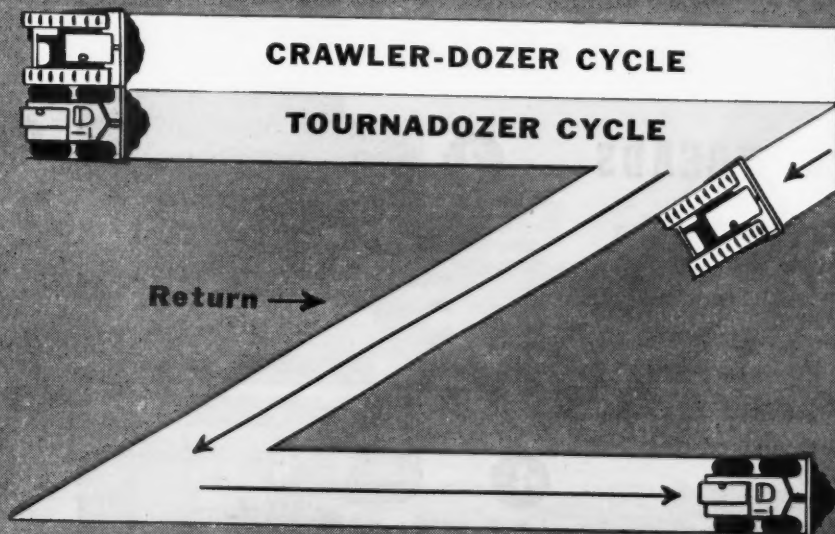
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Tornadozer—Trademark R127

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s shift cut non-productive dozer time



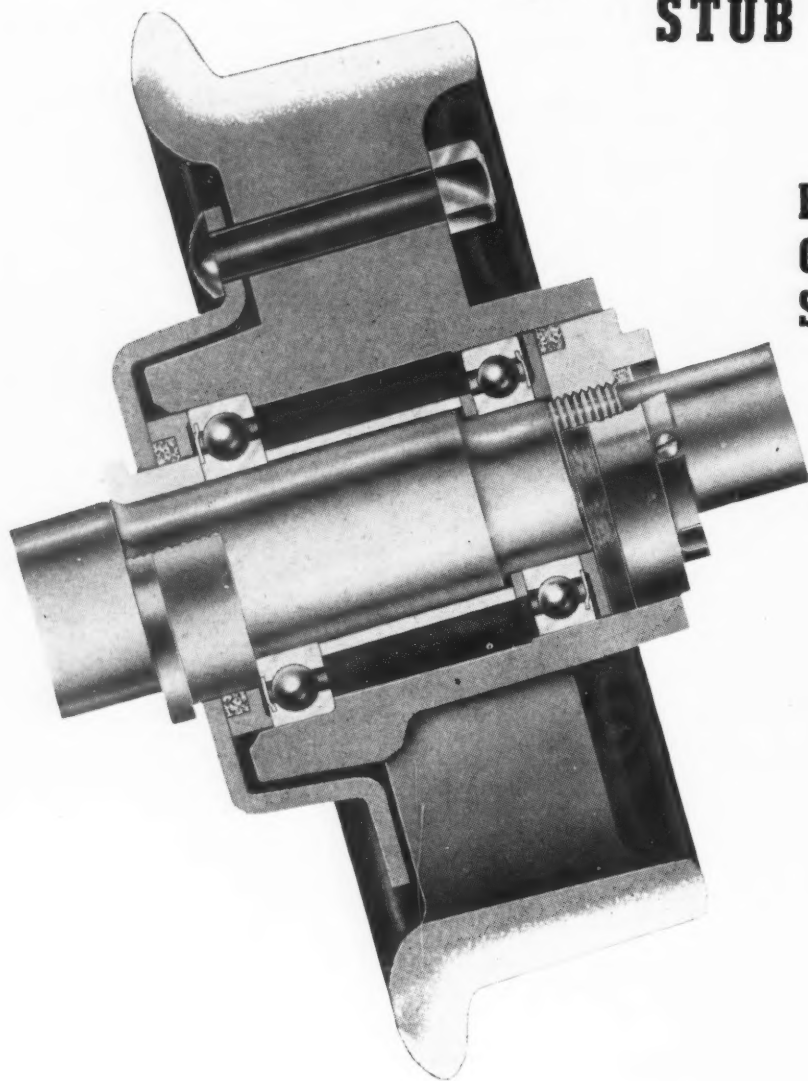
Tornadozers' instantaneous speed selection permits faster travel after blade is full ... immediate directional changes ... faster dozing cycles.

LETOURNEAU
PEORIA, ILLINOIS



TOURNADOZERS

Announcing... **THE NEW S-D "FLOATER STUB AXLE WHEEL ...**



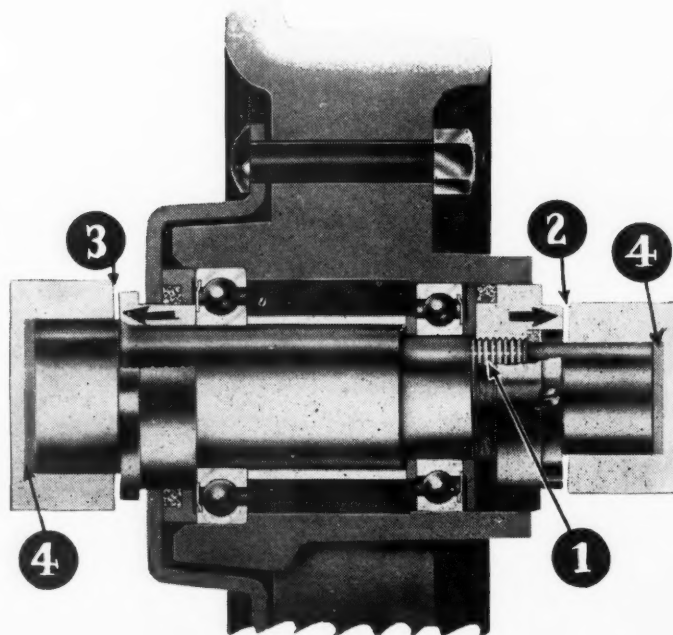
ELIMINATES THE FAULTS OF CONVENTIONAL STUB AXLE WHEELS!

Both ends of hub are sealed to retain the vital lubricant while dirt, foreign matter and corrosive acid water are positively sealed out.

It's completely demountable. No experienced mechanic necessary for demounting. Bearings always remain in perfect adjustment once the retaining nut is tightened.

NO SIDE THRUST ON THREADS

Note, in illustration at right, how we have eliminated all side thrust on threads of axle and nut (Fig. 1). **OUTSIDE** thrust is taken by nut against boxing (Fig. 2) and **INSIDE** thrust is taken by axle collar against boxing (Fig. 3). Axle is of proper length to prevent end thrust of axle against boxing (Fig. 4).



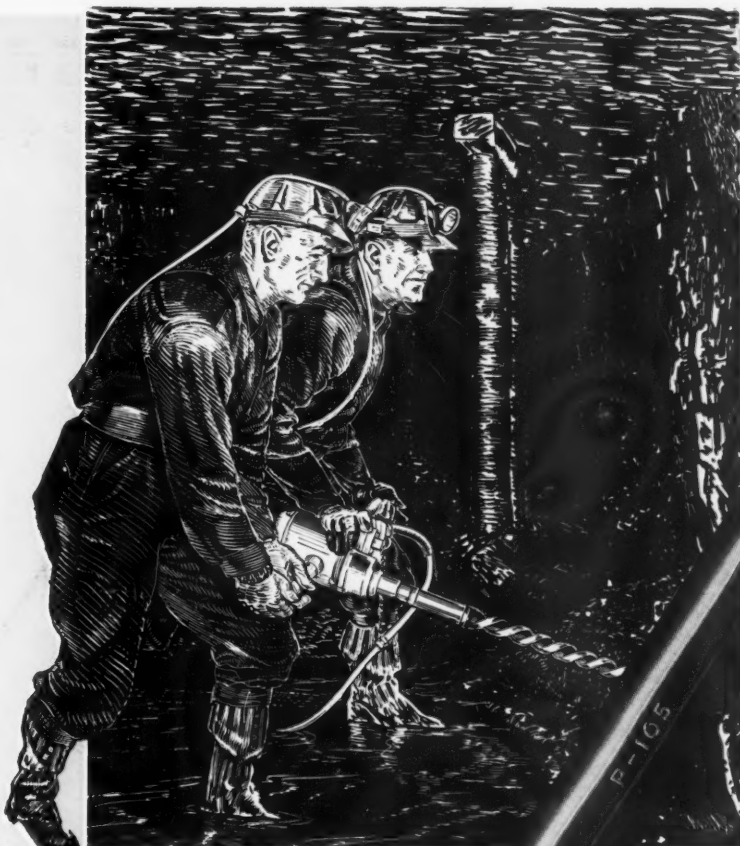
Sanford-Day Iron Works, Knoxville 9, Tennessee

Rome 60

DRILL CORD

IS SAFE

BECAUSE...



- 1** It is jacketed with tough, *flame-resistant* Neoprene.*
- 2** Recommended three-conductor construction provides a safety grounding conductor.**
- 3** The reinforced Rome 60 jacket of Neoprene resists mechanical shock, abrasion, and is unaffected by immersion in acidulous mine waters.***

Meets State of Pennsylvania and Federal flame test requirements by wide margin.

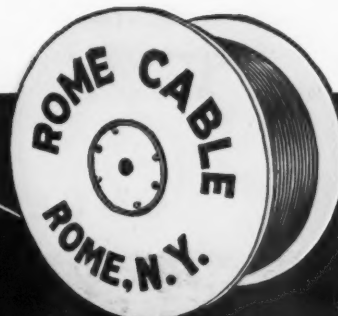
Provides grounding features in accordance with all requirements of the new Mine Safety Code in addition to clear-cut polarity identification.

Also resistant to oils, alkalies, corrosive vapors and surface checking.



FROM BAR TO FINISHED WIRE

ROME CABLE
CORPORATION
 ROME • NEW YORK



Production's Up
with this record-breaking
team!



JOY

COAL CUTTERS

SHORT WALL OR UNIVERSAL TYPES
ARE SETTING NEW RECORDS
UNDER ALL SEAM CONDITIONS



*Consult a Joy
Engineer for—*

*"The World's Most Complete Line
of Modern Mining Equipment"*



The 10-RU Trackless Coal Cutter will topcut, middlecut, bottomcut and shear. It is fast tramming, yet safe and easy to operate under all mine traffic conditions.



The Joy Bug Duster attachment in 7-B and 11-B models prevents cuttings being dragged back into the kerf. Cleaner kerf results, and a better fall of coal simplifies and speeds up production.

JOY SULMET BITS

CARBIDE-TIPPED

Cut up to 30%
faster
Retain cutting
edge longer
Cut more
with less changes

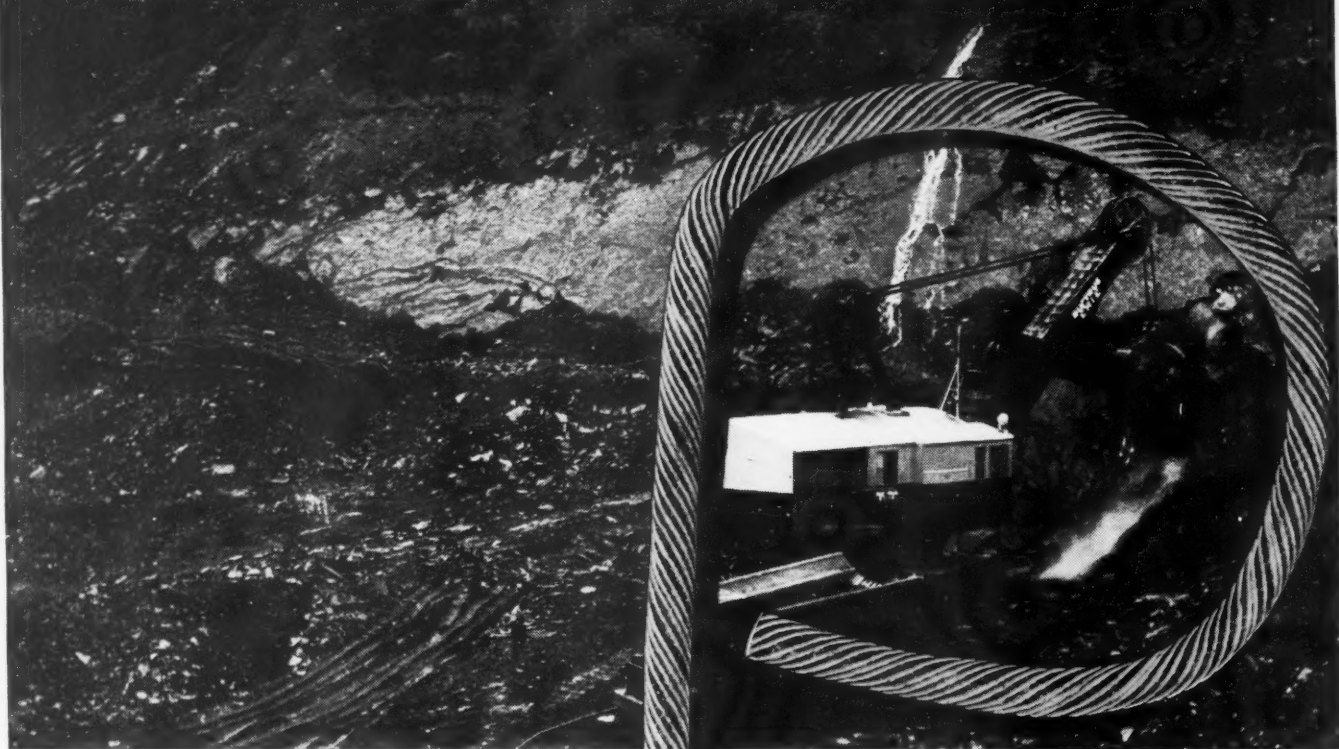


W&D 13

SULLIVAN DIVISION
JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH 22, PA.

IT PAYS BOTH WAYS



when you shoot with

Better fragmentation from blasting keeps shovels working — reduces the yardage digging cost. In strip mining this means overburden comes off faster, making more money for the contractor. In quarrying it speeds up the operations all along the line.

Every Primacord hookup works to this end in two efficient ways. First, branch lines down the holes are in direct contact with every cartridge. When a shot is fired, every cartridge in the load is initiated to its full power. Second, the Primacord trunk line can be laid out to get proper relief of burden where it's

RIMACORD

wanted, when it's wanted. That gives each charge the split-second it needs to deliver at peak effectiveness.

Primacord offers extra advantages when the weather gets tough. Branch and trunk lines hook up with easily tied square knots and half hitches. And because Primacord is insensitive to stray currents, it's the logical detonator to use wherever high voltage electrical equipment is at work.

There's a grade of Primacord suitable for every need. Your explosives supplier will give you the full Primacord story — or you can write us direct.

THE ENSIGN-BICKFORD CO., SIMSBURY, CONN.

Also Ensign-Bickford *Safety* Fuse • Since 1836

JANUARY, 1948

IVAN A. GIVEN, EDITOR

Still Good

WITH 1947 winding up as the second-best production year in history, thanks to the impetus given bituminous output by continued heavy domestic demand and a high rate of overseas exports, speculation naturally turns to what's ahead. For bituminous, the December report of the Coal and Coke Committee of the Ohio Valley Transportation Advisory Board puts demand in 1948 at 585,000,000 tons, including overseas shipments as well as United States and Canadian requirements. This compares with a production of around 610,000,000 tons in 1947. The committee also expects a demand, including exports, of about 560,000,000 tons in 1949 and 550,000,000 tons in 1950.

While 585,000,000 tons is not to be sneezed at, the committee itself makes a statement that would justify expecting more. In the first quarter of 1948, it points out, "demand for and production of bituminous coal will be at peak levels, restricted only by the availability of railroad equipment or by weather conditions." When the level of industrial activity and exports will drop off still is unknown, but many of those whose business it is to peer into the future feel that any such drop will not take place before the last half of 1948—and that if it does come then, it will be only slight.

Fundamentally, also, the more distant future is not without its optimistic side. Some documentation is provided elsewhere in this issue, based on the growth in population and the increased need for new homes and the things people require in their daily lives. Anthracite, in particular, sees the increase in dwelling units in its territory as the foundation for a substantial increase in business in the near future. With new industrial, power and transportation uses now on the horizon, and with competitive fuels experiencing at least temporary if not fundamental price and supply difficulties, coal's position is enhanced even more.

Looking at the prospects from another angle, it can be stated definitely that, barring mine or transportation tie-ups, the supply of coal will be adequate for all normal needs—New Dealers to the contrary notwithstanding. It is extremely doubtful if the Congress will present these New Dealers with all the rationing, price-fixing and control powers they are now arguing for on the basis of a "crisis" that is still to come and which, one suspensions, is largely of their own creation. But the industry should be alert to guard against these or other proposals to put the administration in the saddle by the back-door route. Even more important, coal should concentrate on keeping prices at reasonable levels, improving the quality of its product and expanding its service to the user. Coal's opportunity looms up more and more as the best in a long period of years. By following through in these and other directions, it can solidify its position even more as the No. 1 source of energy for the nation and its neighbors.

Next Step

AN INCREASING number of mines have been reported recently as conforming to federal inspection standards with perhaps two, three or a very few exceptions. As more and more move into that class, the need for emphasis on the next step in safety will become more prominent. That step is making the individual miner an active participant in safety work. Complete safety cannot be attained as long as the individual with the greatest interest—and the most to lose—is inclined to believe that the responsibility is solely the other fellow's. The operator can and should do his part in stimulating participation and correcting unsafe working habits. But for the maximum results in the minimum time, he should have the help of public bodies and, particularly, the organizations representing the miners. More is being offered. Much more should be forthcoming.



NEW HOMES for new families boost use of coal for materials, equipment, services and gadgets and open new home-heat markets.

Coal for a Growing Nation

Our Big Country Needs More Fuel and Power, More Materials and Services—Its Growth Opens Up New Opportunities for Coal — Increasing Demands by Home, Farm and Industry Lie Ahead

By K. C. RICHMOND, Editor, Coal-Heat, Chicago

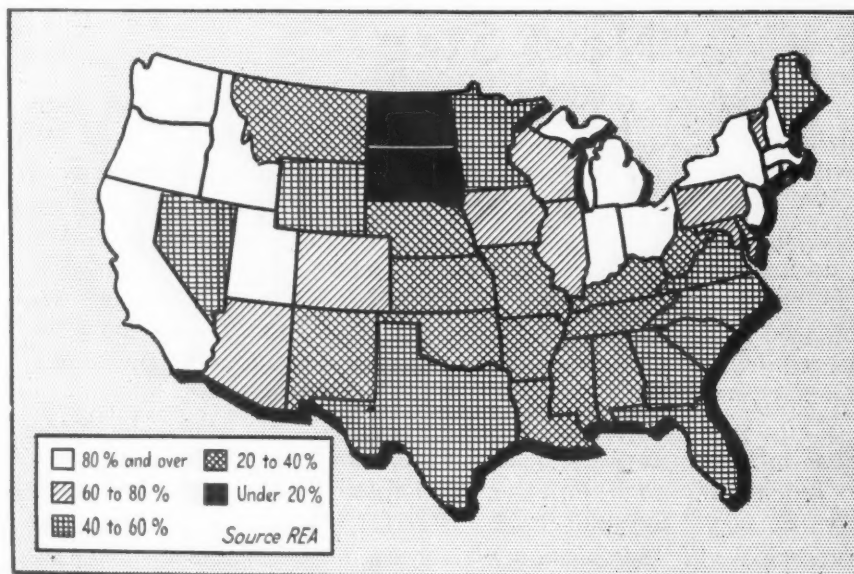
THIS COUNTRY IS GROWING. Its frontiers are limitless. Its needs and demands for heat, power, light and the varied products of manu-

facturing, chemistry and agriculture have been and are limited only by the purchasing power of the nation and the initiative of the men

who sell the products of industry.

In 1920, our population was 105,000,000. Today it is over 140,000,000. Part of this growth is due to people living longer than they used to. Back in 1900, the average life expectancy in the United States at birth was 47 years. By 1930 this had stretched to 60 years and by 1940 to 63 years. The number of persons over 65 has increased 35 percent since 1930.

Up to the beginning of the war, we averaged 1,280,000 marriages a year, but from 1940 through 1946



ELECTRIC POWER now serves machines and stock on over half the nation's farms and is reaching new farms every year.



NYLON STOCKINGS are only one of coal's growing byproduct outlets.



TOBACCO CURING, SNOW REMOVAL are new jobs for coal. They typify wider uses and growing demands on the farm and in the city.

marriages totaled 12,126,276. There were 2,314,491 in 1946, 68 percent above 1935. And the Census Bureau estimates that there will be 5,390,000 more by 1950.

The baby crop, of course, has been good—over 23,000,000 since 1940, not including 1947, which probably added 3,800,000 more. Since 1920, our birth rate has run from 16 to 23 per thousand and the death rate from 10.9 to 13, with a net increase of births over deaths of 6 to 11 per thousand.

Along with the increase in population, the size of families decreased from 4.1 in 1930 to 3.8 in 1940, which means that seven years ago it took 7.9 percent or 19 more dwelling units to house 1,000 people than it did in 1930. Back in 1940, there were some 35,000,000 dwelling units in this country. Today, there are nearly 42,000,000 families. Too many young couples are doubled up with the folks because of the lack of housing.

This adds up to higher demand for housing and results in a substantial increase in the demand for coal, both directly and indirectly.

Domestic heating absorbs one ton of bituminous coal in five—something over 100,000,000 tons a year; nearly three out of four tons of anthracite—some 40,000,000 tons; about 8,000,000 tons of coke (when people can get it); and 1,500,000 tons of lignite—about half the total lignite production. The grand total is over 150,000,000 tons annually, 50 percent more than is used by the railroads and almost twice what is used by the electric utilities.

For cooking, we use 8,000,000 tons annually, 10,000,000 tons to

produce cooking gas and 2,000,000 tons more to generate electricity for cooking—a total of 20,000,000 tons. For hot water, we require some 41,000,000 tons annually—1,200,000 in kitchen ranges, 19,000,000 to heat the water coils in our furnaces and boilers, 5,000,000 in bucket-a-day heaters, 6,300,000 to make gas for side-arm or automatic gas heaters, 3,000,000 in apartment houses and 1,500,000 to generate electricity for electric heaters.

What's more, the domestic market is growing, despite some competition from oil and natural gas. To be sure, we've lost some business we never had to oil and natural gas, but more people are using coal than ever before. How much business we're going to get from the nation's 7,000,000 wood users we don't know. Since 1940, however, the evidence shows that a lot of coal went into fewer wood-using homes in several sections of the country. The potentials in this field are all but unlimited. They justify a long and detailed study and report and plenty of sales cultivation.

Every new house that goes up adds to the current and future requirements for coal. Here is one of our major sources of new business, both directly and indirectly. Just as long as the girls wear high-lift bras, low-necked dresses and skimpy swimming suits and we have full moons, lover's lanes and sofas in the living room, we should not underestimate either biology or the need for new housing.

Suppose we document this. Construction of the average small house involves some 30,000 items and 50 to 150 tons of materials. To

the average buyer, this is usually the largest investment he ever makes. To the nation, it is of tremendous social importance. To industry, it is a stabilizing influence. To labor, it is a prime source of employment. And to the coal industry, each new house means 6 to 10 tons of coal to produce the materials that go into it, $\frac{3}{4}$ to 5 tons a year for the electricity it uses and 5 to 15 tons a year for heat, hot water and fuel for cooking. Ten out of 19 homes that use gas for cooking use gas made from coal, you may remember.

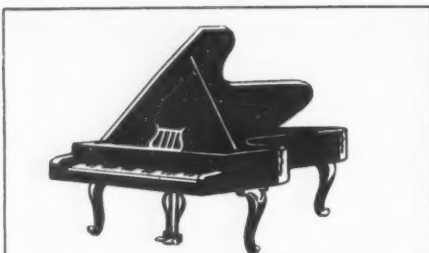
Obviously, the construction of a million or so houses, or even a thousand, requires no little amount of power, electricity and fuel, directly and indirectly, to produce, transport, manufacture and distribute the materials required in their erection and equipment. Here are some of the details:

Construction—Nearly 4 tons of products made from steel, wrought iron and cast iron including, among others, the following:

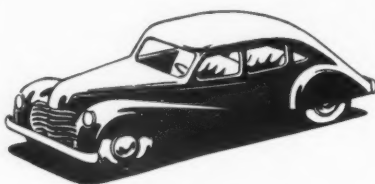
- 3,620 lb. of finished steel, including 1,160 lb. of metal lathing.
- 440 lb. of steel nails.
- 418 lb. of gutter and downspout.
- 200 lb. of flashing.
- 175 lb. of electrical conduit.
- 65 lb. of light building shapes.
- 60 lb. of door, window hardware.
- 93 lb. for a hot-water tank.
- 13 lb. of smoke pipe.
- 15 lb. for a medicine cabinet.
- 950 lb. of pipe and fittings.

Equipment—About 5,180 lb. of steel, wrought iron and cast iron including, among other things, the following: kitchen range, refriger-

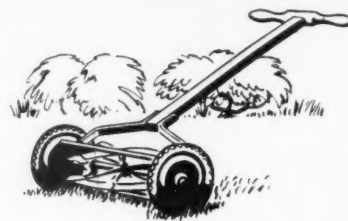
IRON AND STEEL FOR HOME AND FARM



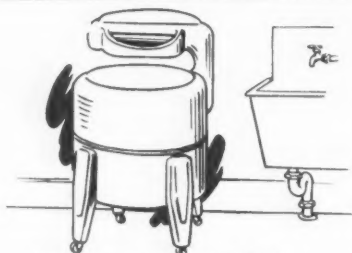
Piano—222 lb.



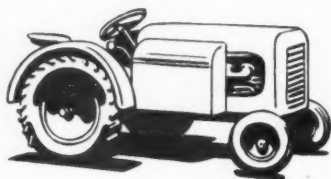
Automobile—3,545 lb.



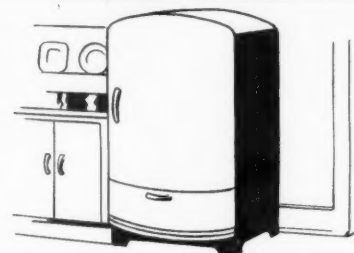
Lawnmower—28 lb.



Washing machine—38 lb.



Farm tractor—1,543 lb.



Refrigerator—172 lb.

Source—American Iron & Steel Institute

EVERY POUND of iron and steel listed for these products requires $1\frac{1}{2}$ lb. of coal in blast furnaces. More homes for new families and more food to feed them will mean bigger demands on farm and industry, with growing markets for coal.

erator, cooking utensils, cutlery, floor lamps, steel springs for mattresses and chairs, radiators, steam boilers, plumbing lines, bath tubs, wash basins, laundry tub, sash weights, valves and a coal chute.

Producing this amount of steel and iron takes about 6 tons of coal, which shows how market needs and housing construction can affect coal production, creating new demands for electricity, heat and hot water.

In addition, buying or building a new house usually means considerable household equipment, appliances and garden tools, the manufacturer of which requires substantial quantities of iron, steel, electrical energy, coal and coke. Coupled with normal replacement needs, growth in population and increasing modernization activities, the annual sales of even some very small items like these can affect the production of steel and coal more than one might assume. Try to figure out how much the various kitchen appliances, tools, etc., around your home or in your neighborhood weigh and how much coal it took to produce the steel, manufacture and distribute them.

From all these facts, it's easy to figure what the marriage of a million couples or the construction of a few hundred thousand new dwellings or the replacement of a large number of old ranges, refrigerators or washing machines means to business, employment and coal and steel production. As already indicated, building only 1,000 homes in a given area adds between 6,000 and 10,000 tons yearly to the demand for coal, somewhat as follows:

Heating—5,000 tons or more.

Hot water—300 tons or, with electricity, 2,500 tons.

Cooking—with electricity, 825 tons; with manufactured or mixed gas, 1,500 tons.

Lighting and other electrical needs—900 tons.

Coal for Farming Climbing Steadily

The more we study fuel needs, the more we are convinced that the farm is one of the best markets we have for new heating equipment, coal and electrical energy. The farmers have money. More of their homes, outbuildings and barns are painted today than we have ever seen before. Rural electrification is reaching out into the sparsely settled sections. Tractors and other mechanical equipment have replaced the horses and mules on a lot of our farms. The farmers are buying furnaces, stokers, frozen-food units and all kinds of electrical equipment.

"During the next five years the farm homes of America are going to be remodeled and replaced on a scale never before equaled," wrote Ray Yarnell, editor, *Capper's Farmer*, in a recent letter. "In nearly every instance, this will involve the installation of a modern heating system of some kind. That is an opportunity for aggressive expansion on the part of the coal industry and the various makers of equipment such as furnaces, stoves and stokers using coal."

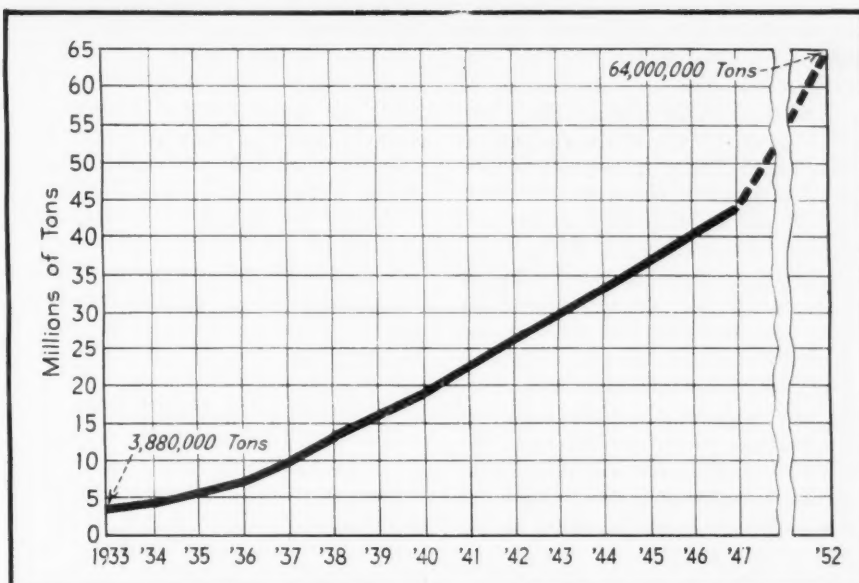
From the heating viewpoint, then, it is evident that farmers are

going to use a lot less wood and fewer stoves and more central heating and more coal. It is safe to predict that a lot of hog barns, chicken houses, milk houses and other farm buildings are going to be heated part of the year. The needs for hot water alone are of tremendous significance.

The Farm Electrification Bureau of the National Electric Manufacturers' Association is placing increased emphasis on the farm market, giving these two reasons: (1) the world-wide shortage of food is likely to keep farm incomes at present record levels for a considerable time and (2) only about half of the nation's 6,000,000 farms are now electrified. As wires are strung to new farms at a high rate, a completely virgin market is being created for all types of electrical equipment.

Back in 1935, one farm in nine, or 11 percent, had electric service. Today, nearly 60 percent enjoy the advantages of electricity. By 1957, we would hazard the guess that three out of four farms will be using electricity, most of it generated by coal. Already, many farms use over 3,600 kw.-hr. a year—about three times as much as the average city dweller—for some 450 purposes, and the farm load is growing every month. David M. Salsbury, executive vice president, Westinghouse Electric Corp., estimated that the nation's farms offer a potential market for more than \$5,000,000,000 worth of electrical equipment in the next five years. By the end of this period, he predicts, 1,500,000 more farms will

STOKER COAL OUTPUT MOVES UP



STOKER COAL demand may push upward to 64,000,000 tons a year by 1952. Already it has almost doubled demand in 1941.

have electric power and farmers will buy such varied equipment as ventilators, heaters, water-pumping systems, milk coolers and household appliances. Farmers already are learning that 5c. worth of electricity will shell 20 bu. of corn, separate 2,000 lb. of milk, pump 400 pails of water, milk 20 cows or cool 25 gal. of milk.

One of the oldest household stoker manufacturers reports that about 10 percent of his sales are installed in greenhouses, mushroom barns, brooders for chickens and ducks, bake ovens and high-pressure boilers supplying steam for dairying and other varied industries such as tire retreading, metal melting, silk drying, etc. The sale of stokers in the Carolinas for tobacco curing has been surprising and a number also have been installed elsewhere for seed-corn drying. Another interesting use for coal on the farm is in hay and forage drying.

Coal for Electricity Up With Output

Including farm demands, the electric industry expects a 38-percent increase in demand in the next five years. Bearing out this expectation, the newspapers nearly every week report new records in power output. For instance, output of Commonwealth Edison, Chicago, for the week ended Oct. 25, 1947, was 213,693,000 kw.-hr., against 199,746,000 kw.-hr. for the same period last year—a 7-percent gain. This company is investing \$186,000,000 in a five-year expansion

program to add 557,000 kw. to its generating capacity. The Union Electric Co., St. Louis, is installing a new 80,000-kw. turbine-generator in its steam plant at Venice to help meet demands that are 7.3 percent above the highest wartime peak. Annual residential use in St. Louis jumped from 1,309 to 1,402 kw.-hr. during the past year, representing an increase of nearly 150 lb. of coal per family—which is not to be sneezed at over the years.

Recent figures from the Edison Electric Institute indicate that the electrical generating capacity of the nation's plants will be increased 16,769,000 kw. by the end of 1950, with steam turbines producing over 14,000,000 kw. of this amount. Tentative estimates for 1951 indicate another million kilowatts by private industry. Nationally, according to the Institute, the power companies added 1,102,000 new customers in the first six months of 1947—an average of 183,000 new customers a month, over 9,000 a month more than the monthly average for 1946, which broke all previous records.

Electricity used per family also is setting new records. For the year ended June 30, 1946, the average domestic consumer used 1,290 kw.-hr.; for the year ended June 30, 1947, he used 1,385 kw.-hr.—a very nice increase. It will be around 2,000 kw.-hr. per year in 1951.

Outside a hydro, oil or gas territory, every extra kilowatt-hour added to the power load means an increase to the coal industry of about 1.5 lb. of coal. Thus, each new electrical appliance that

goes into use in most of the nation adds to the yearly demand for coal somewhat as follows:

- Clock, 25 lb.
- Radio, 150 lb.
- Toaster, 45 lb.
- Refrigerator, 500 lb.
- Oil burner, 465 lb.
- Range, 1,650 lb.
- Glass percolator, 105 lb.
- Water heater, 5,250 lb.
- Iron, 150 lb.

Improved standards of lighting also are boosting demand for fuel to generate electricity. Sale of power for residential lighting is three times what it was in 1938, commercial lighting sales have doubled and industrial lighting sales have more than doubled. At present, in the average home, about one-third of the electrical energy used is for lighting—around 400 kw.-hr. a year. If good lighting were maintained, this probably would be doubled. And if all industrial and commercial lighting were brought up to current best practice, authorities claim that about five times as much current would be used.

Power producers actually expect an average increase of about 40 percent in electricity for lighting, which would mean an increase from present requirements of 600 lb. of coal per dwelling per year to 840 lb., or about 2,000,000 tons annually, not including the increase that could be expected from new housing outside hydroelectric territory.

Residential use of electricity, then, including lighting and appliances, air conditioning and refrigeration (which, though still in its infancy, accounts for over 16,000,000 tons of coal a year), adds up to a big chunk of coal and removes any doubt about what the electrical industry means to the nation's coal producers.

How these new electrical demands—residential as well as industrial and commercial—count up is shown by a recent report of the Federal Power Commission citing coal consumption by electric utility plants in August, 1947, of 7,772,512 tons against 6,609,946 tons in August, 1946—an increase of 17.6 percent—and against 6,984,339 tons in July, 1947—an increase of 11.3 percent.

Coal for Steel Rising With Demand

Passing from the electric utilities to the steel industry, completion of the construction and improvement program that steel makers began two years ago will

increase present capacity by some 2,500,000 tons in steel ingots, 3,000,000 tons in pig iron and 3,000,000 tons in coke, not to mention 3,500,000 tons of new sheet and strip mill capacity, according to the American Iron & Steel Institute. While the population grew 55 percent between 1910 and 1947, steel ingot capacity rose 134 percent to a present record peacetime level of 91,000,000 tons a year. Under the new program, it is logical to expect some 95,000,000 tons of coal to go to the steel industry—80-odd million tons of this to produce coke. The steel industry's own electrical requirements also are not to be overlooked because, since three-fifths of its electrical needs are purchased, it takes about 10,000,000 additional tons to supply them.

And steel demand looks good. There are more than 10 tons of iron and steel in use in the United States for every man, woman and child, much of it in buildings, automobiles, bridges, railroads, ships, machinery and tools. Our annual consumption before the war was 595 lb.; in Italy, 100 lb.; in England, 415 lb.; in France, 190 lb.; in Russia, 170 lb.; in Sweden, 360 lb.; in Australia, 265 lb.; in Canada, 305 lb.; and in Japan, 135 lb. In a normal year, it is said that 40 percent of the jobs in this country and 45 percent of the income are directly traceable to the iron and steel industry or the industries that use iron and steel as a major raw material.

When Mrs. John Q. Public goes out and buys a steel kitchen range, it means 300 lb. of coal to the coal industry; 337 lb. if she buys a refrigerator; 21 lb. for a new garbage can; 125 lb. for the tin cans that hold her family's food for a year, and 56 lb. for other cans and containers. The more appliances, bath tubs, automobiles, golf clubs and razor blades she and her family buy, the more tonnage it means for the steel and the coal industries. If you want to do some really fancy figuring, calculate how much coal it will take next year to help make the steel for the safety razor blades that will be used by the half-million young fellows who start shaving, or the girls who buy corsets, phonograph needles or zippers. On top of this, add the growth in population to demands on these two industries. Again we say, we live in a dynamic economy.

For her ordinary household needs, Mrs. J. Q. Public is responsible for the use of 800 lb. of coal to keep

her in paper for magazines, paper bags, wrapping paper, cartons and newspapers. She will use 870 lb. of coal if she sends her laundry out for a year. With 3 lb. of coal a week, the laundry can provide her husband with a clean shirt every day. Some 8,000,000 families are having an average of 879 lb. of laundry done a year, which means 17 lb. of coal per week to take care of the average family's weekly bundle, according to C. H. Lanham, department of production and engineering, American Institute of Laundering. The nation's 7,000 power laundries, Mr. Lanham says, use approximately 1 lb. of coal for each pound of laundry work processed.

Mrs. Public's hot-water needs alone deserve a detailed report. In the residential field, this basic need represents over 40,000,000 tons of coal annually.

Incidentally, it takes 6 to 10 lb. of coal, originally, to produce a pair of nylon stockings. So, every time you pass 250 women or so on the street (in the wintertime), you might say, "There goes another ton of coal." Thus far, we haven't had a chance to explore the statistics on the use of nylon panties, slips or sweaters, but we do know that it takes 33 lb. of coal to help produce the apparel the average family buys per year, not including shoes, which take 3 lb. of coal per pair. So, here and there, coal touches the life of every man, woman and child in this country—say, 4 tons of coal per year each. Thus we could say that the birth of 3,440,000 babies in 1946 added 13,760,000 tons to our annual coal requirements.

Coal for Railroads Still Basic

How much coal the railroads are going to use five years hence depends on a lot of variables or unknowns. In 1926, they moved 76.4 percent of the commercial traffic in freight-ton-miles; 69.3 percent in 1945. The Great Lakes carried 14.1 percent in 1926; 9.7 percent in 1945. Our rivers and canals carried 1.6 percent of the total in 1926; 3.7 percent in 1940; 2.9 percent in 1945. Motor trucks carried 4.0 percent in 1926; 8.4 percent in 1940; 5.6 percent in 1945. The oil pipe lines moved 3.7 percent in 1926; 12.4 percent in 1945.

Of the commercial passenger traffic in miles, electric interurban dropped from 11.7 percent of the total in 1926 to 1.6 percent in 1945;

inland waterways from 3.9 to 1.6 percent. Buses jumped from 9.2 to 21.2 percent between 1926 and 1945. The air carriers' percentage increased from 2.7 percent to 2.8 percent between 1940 and 1945. Meanwhile, between 1926 and 1945, the railroads dropped from 75.2 to 72.8 percent of the total.

There isn't space here to explore the ramifications of these changes, the developments in motive power and rolling stock or the effect of the private automobile or airplane on railway passenger traffic. We would hazard the guess, however, that the railroads will continue to take about 20 percent of our bituminous coal and that the requirements will increase in some areas. Indirectly, it's going to take considerable coal to produce the steel to build the cars, the ships, the trucks and the engines this country is going to buy the next few years and no one knows how much to produce some of the gasoline or oil, ultimately, to operate them. These indirect demands and uses for coal are too generally overlooked. Altogether, they represent several weeks' coal production each year.

According to the latest Census of Manufacturers, nearly 2.5 tons of coal (2.42, to be exact) went into every \$1,000 value of product manufactured and 1.25 kw.-hr. of electric energy per \$1 value of product. The tonnage used is surprising when you look into it, as the following table suggests:

Industry	Tons per \$1,000 Value of Product
Paper	4.57
Cement	27.0
Sewer pipe and like products	39.0
Distilled liquors	9.6
Salt	17.9
Baking powder, yeast and other leavening compounds	3.8
Food and kindred products	1.0

What's more, the horsepower per wage earner in manufacturing industries is increasing steadily, as the following figures show:

Year	Hp. per Worker
1849.....	1.15
1879.....	1.25
1889.....	1.40
1899.....	2.24
1909.....	2.98
1914.....	3.37
1923.....	4.03
1929.....	5.12
1939.....	6.48

By 1950, the horsepower per worker will be substantially higher, we're sure. The trend is certainly in that direction. Back in 1879, this country had less than 3,500,000 hp. in its factories, with 2,750,000 workers. Fifty years later, horsepower had increased 12.5 times, workers 3.25 times and wages 12.75 times, while the population increased only 2.5 times. That increase from 3,500,000 to 43,000,000 hp. in our factories in 50 years helped make this country the leader in manufacture and in the standard of living.

Too few of us appreciate what even the production of a commonplace item such as a can of peas requires in power. In describing this, an ad for *Power* magazine in 1944 said:

"Power enables the farmer to plant, care for and harvest his peas. It builds his tools and machinery. It rushes the peas to the cannery, garden fresh, and handles every stage of their preparation.

"Power mines the ore that makes the cans. It smelts the ore, rolls the metal, plates it, shapes it, solders it—and brings the completed cans to their meeting with the peas.

"Power sterilizes the cans, fills them, seals them, labels them, makes the cartons they're packed in—makes the board that makes the cartons—and the pulpwood that makes the board.

"Power distributes the peas to warehouses—to wholesalers—to retailers—and even makes possible the advertising that merchandises those peas. Yes, from farm to table, it's power every erg of the way."

Happily, too, we're making our fuel go further or do more. Such have been the improvements in modern steam plant operation, for example, that we used only about 40 percent as much coal per kilowatt-hour in 1946, for example, as we did in 1919.

Thanks to the inventor, the business man, the salesman and our natural resources, we now live in an age of power, when machines multiply our efforts incalculably. No longer are we dependent on the ox, horse, camel, elephant or dog to lighten our tasks. Muscle is giving way to the machine. Ours is a machine age—an age of power.

It's clear also that we're going to use more coal for chemical and other purposes. Much is going on in this field that isn't being publicized, such as the purchase of coal lands by big chemical companies. Although we are dealing with some

of the byproduct uses of coal, they are no less significant. In carbonizing coal, we averaged 1,350 lb. of coal per capita in 1944, or 94,438,000 tons for the nation as a whole. While this coal helped to produce coke, steel and manufactured gas, it gave us also, per capita:

- 1.8 lb. of finished dyes.
- 4.3 oz. of medicinals.
- 1.4 oz. of perfume.
- 1.4 lb. of resins (plastics).
- 0.53 lb. of chemicals for rubber.
- 0.29 oz. of photo material.

Apart from mounting demands for coal along familiar lines in industry, the home and transportation, new uses are developing also. Take snow melting, for example. Thousands of tons of coal can be used to keep the snow melted off sidewalks, driveways, airplane runways, loading platforms, service stations, railway terminals and streets. This already has been done successfully. It isn't theory; it's logical, feasible, practicable. By putting wrought iron pipes in concrete through which you can circulate hot water or other liquids automatically during snowfall, you don't have any snow to shovel or slush to wade through. Keeping the sidewalks and driveways dry and free from snow and ice protects health, prevents accidents and facilitates loading and unloading cars and trucks. Thus, there are distinct advantages to piping more streets, viaducts and bridges in the congested traffic sections of larger cities, as well as private sidewalks and driveways.

Coal for Stokers Growing Outlet

Hand in hand with growing needs for coal goes an increasing need for stoker coal. In 1935, this country was using some 6,000,000 tons of coal annually in smaller stokers. In 1939, the demand jumped to 16,450,000 tons and by Jan. 1, 1942, the requirements were 27,000,000 tons. During the four war years, the demand rose to over 40,000,000 tons. Today, it is over 46,000,000 tons.

Something of the growth in stoker sales activity is shown by these figures from the U. S. Department of Commerce:

Year	Stoker Sales
1932.....	9,521
1934.....	28,704
1936.....	86,080
1939.....	104,289
1941.....	192,447
1946.....	190,917

What the demand for stoker coal will be five years hence, in 1952, is difficult to predict. It will depend on (1) what kind of sales, engineering and service job we do in both coal and stoker industries, (2) what the nation's effective purchasing power happens to be, (3) what the oil and gas industries are able to do, and (4) what the supply and prices are in coal, oil and natural gas and the various types of heating equipment.

There are, however, several things we do know:

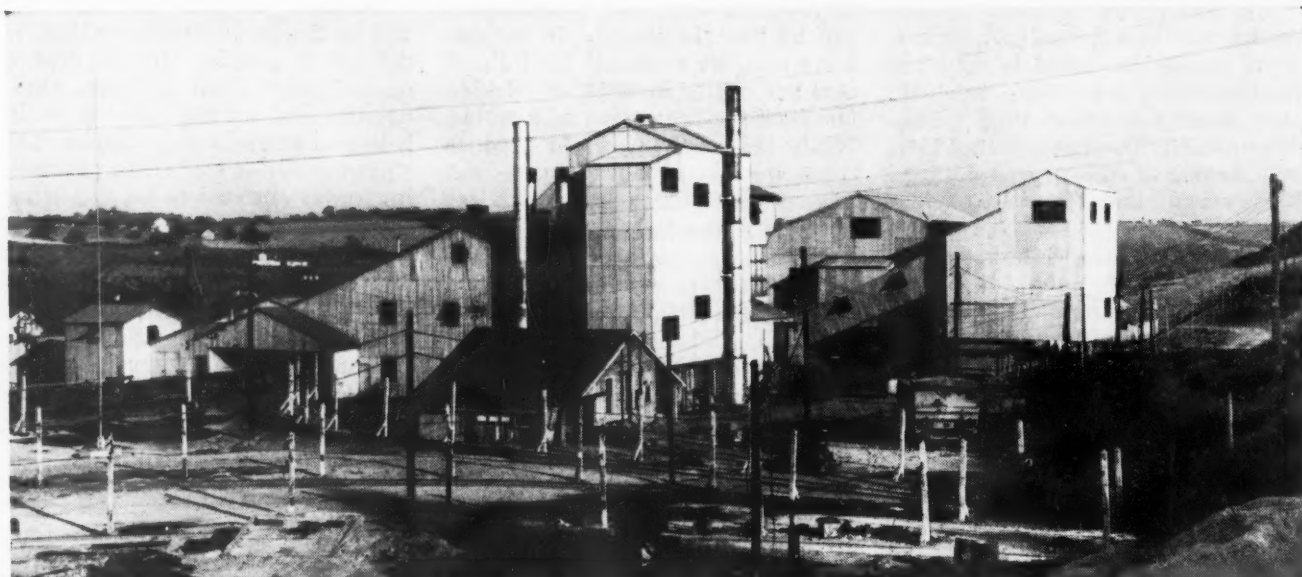
1. This country is growing.
2. People want comfort.
3. There are limitations on how much house-heating business the natural gas industry can take on.
4. The oil industry has a lot of problems it is not talking about publicly.
5. The available supply of coal is more than adequate for the next few thousand years.
6. Many people are thrifty and the cost of coal heating (other things being equal) alone assures us a large demand for stokers.
7. The stoker industry is getting back to fundamentals, beginning to hire and train more men.
8. The coal industry is continuing to invest millions of dollars in new preparation plants.
9. About half of all leads for stoker sales are coming from old customers.

If we take a most conservative view of sales for the next five years—say, only 150,000 units a year, which is what we sold in 1940—that would mean 750,000 units. On the basis of the same size distribution, that would mean a gain of 3,720,000 tons a year, or 18,600,000 tons for the five years. This would give us, then, a demand for some 64,000,000 tons of stoker coal in 1952.

Suppose we take a net gain of around 200,000 units a year. That would add over 4,000,000 tons of coal annually to our demand or another 20,000,000 tons by the end of 1952, giving us a grand total demand for some 66,000,000 tons of stoker coal.

If we do that—and there should not be too much question about it if we keep our skirts clean and do a decent job—the stoker coal demand then will be twice what it was in 1943, or over 50 percent more than it was on Jan. 1, 1946.

This growing stoker demand, with bigger home, farm and industrial needs, means new tasks as well as new opportunities for coal.



NEW TABLING PLANT AND FLASH DRYER for 3/16x0 help Piney Fork meet competition in the power-plant fuel market, in addition to raising preparation-plant efficiency.

Fine Coal Tabled and Dried

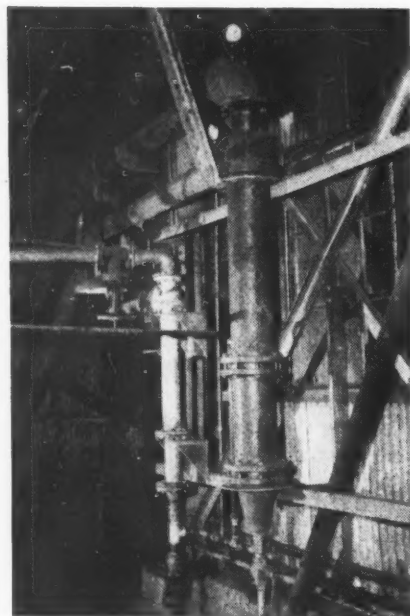
New Table Plant Cleans 3/16x0 to 7.5 Percent Ash and Raises B.t.u. Value Substantially—New Flash Dryer Takes Surface Moisture Down to 2.5 Percent — Cost Being Quickly Returned in Increased Coal Recovery

By R. E. ZIMMERMAN

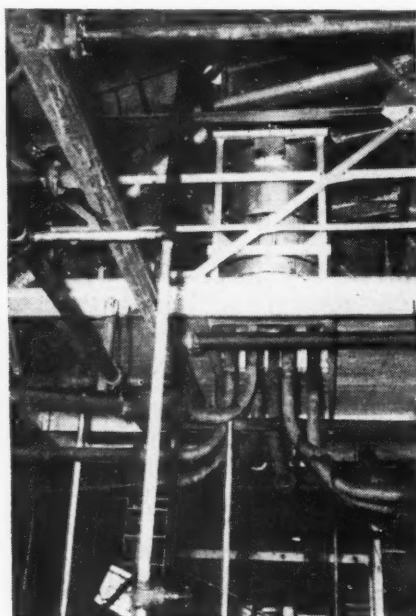
Preparation Engineer, The Hanna Coal Co., St. Clairsville, Ohio

TO MEET competition from other coal-producing areas serving the same power-plant fuel market, and in line with a program of continuously improving preparation efficiency at the Piney Fork operation, Piney Fork, Ohio, a table plant and flash dryer have been installed to clean and thermally dry the 3/16x0 coal.

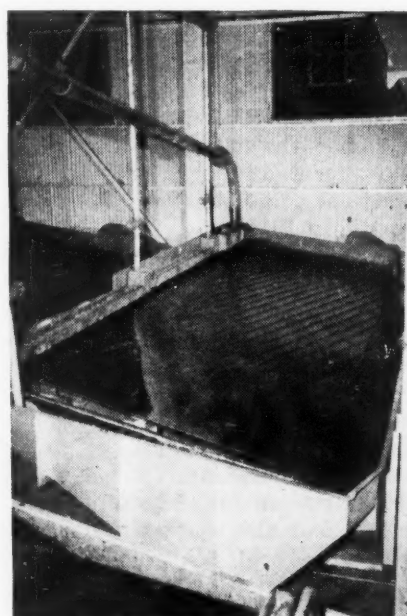
The desire to improve the heat value of the fine coal, plus the rapid



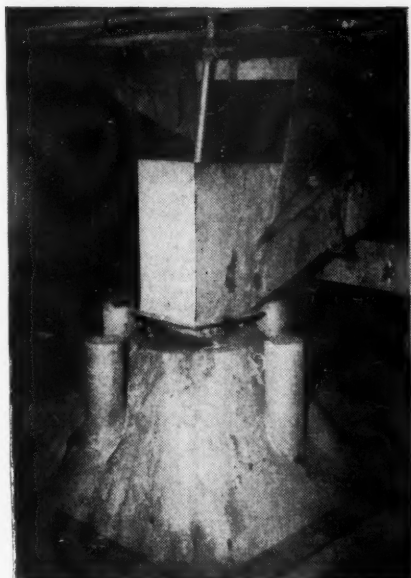
FINE COAL in the overflow from the 3/16x0 washed-coal settling tank is separated by a "water cyclone."



THIS DISTRIBUTOR equalizes the 3/16x0 feed to the eight coal-washing tables. A ninth table is a spare unit.



EIGHT TABLES process 65 tons of 3/16x0 coal per hour. Three refuse bands appear at the center of the near edge.



BEFORE FLASH DRYING, a centrifugal dryer reduces moisture to 7.5 percent.



A 3-HP. MOTOR V-belted to a speed reducer drives a table at 265 strokes a minute.



RICHARD PEDNAR, second-shift tabling operator, at the Hanna-built control board.

increase in impurities in the fine sizes, brought about by 100 percent mechanization and "total-seam" mining, as well as the addition of strip-mined coal, has made it necessary for The Hanna Coal Co. to make a thorough study of its coal-washing methods at Piney Fork and inaugurate steps to solve these problems. Various processes were investigated, washability studies were made and a pilot plant operated before deciding upon the full-scale additions and changes in the previous plant flowsheet.

Coal treated at Piney Fork comes from the Pittsburgh No. 8 seam, 80 percent of which is mined by underground methods and 20 percent by stripping. With a completely mechanized mine loading everything at the face, including 10 to 18 in. of drawslate, plus the usual high clay content in strip-coal fines, the burden on the cleaning plant has been magnified many times over that encountered with the hand-loading and room gobbing of earlier years.

The normal run-of-mine ash of the No. 8 seam in this area would be 9 to 10 percent without extraneous impurities from the top or bottom. With "total-seam" mining, the run-of-mine will carry 17 to 18 percent ash after the larger rock pieces have been scalped off. The 3/16x0 size, which is the fraction selected for tabling, will go as high as 21 percent. To meet the over-all ash and B.t.u. requirements, the reject at Piney Fork will run as high as 38 percent of the feed when straight underground coal is put in the plant, or, depending upon the

quantity of strip coal added, will average 35 percent.

To stay in the market with our fine sizes, it was required that we produce a 7.5-percent-ash coal with a heat content of 13,000 B.t.u. The raw fines have a B.t.u. value of only 11,000. Our previous washing system has proved very adequate for the coarser sizes. In the finer sizes, however, it was found impossible to meet these requirements. Attempts to hold down the ash in the 3/16x0 size in our jig operations resulted in excessive loss of coal in the reject, not only in the 3/16x0 sizes but in the coarser coals treated in the same jig. Installation of Deister Concentrator Co. tables has not only given us the desired ash, but has cut our loss of float coal in the jig reject to a point where the savings in coal will shortly pay for installation costs.

Original Coal Flow

The Piney Fork plant flowsheet before the installation of the flash dryer and table plant is shown in Fig. 1. Run-of-mine coal from either strip or underground operations is fed to the plant via 10-ton mine cars and a rotary dump. This run-of-mine also may be combined with coal from a "foreign-coal" railroad-car hopper, all discharging to a "scalper" shaking and screening picking table. Here the plus 7-in. rock is scalped off and the minus 7 in. passes through 7-in. round holes to the main raw-coal drag conveyor going to the washing plant.

The rock scalped off is crushed to

minus 7 in. and combined with washery reject. The mixture is sent to either of two 60-ton bins, from which it is discharged into a 20-ton-capacity Differential larry or its 18-ton trailer and hauled some 4,000 ft. up a 6-percent grade to a 7,000,000-ton storage area.

The picked plus 7-in. coal is combined with washed 7x1¼ and re-screened to sizes varying with market demands. Plus 5-, 7- or 8-in. lump is hand picked again before final loading. The reject from this table is crushed to minus 1¼ in. and re-washed with minus 7-in. run-of-mine. Mixing conveyors and a washed-coal crusher permit loading numerous sizes and mixes on five loading tracks.

Minus 7-in. run-of-mine, plus the previously described pickings, are discharged into a 200-ton surge bin. Variable-speed reciprocating feeders move the coal to a raw-coal shaker. The 7x1¼ size goes to one Link-Belt air-pulsated jig. Originally, the 1¼x0 size went to a second Link-Belt jig. Clean coal from both were combined on a classifying and dewatering shaker screen, the bottom deck of which was equipped with ⅛-in. openings. The ⅛x¾ size was further dewatered by passing it through a Link-Belt screen-type dryer, where its surface moisture was reduced to 1.5 percent. The ⅛x0, plus the bulk of the washery water, discharged into a rectangular drag-type settling tank. The settled ⅛x0 was then conveyed to C-M-I centrifugal dryers where surface moisture was reduced to 7.5 percent. This product was then combined with the heat-

PREPARATION AT HANNA COAL'S PINEY FORK PLANT

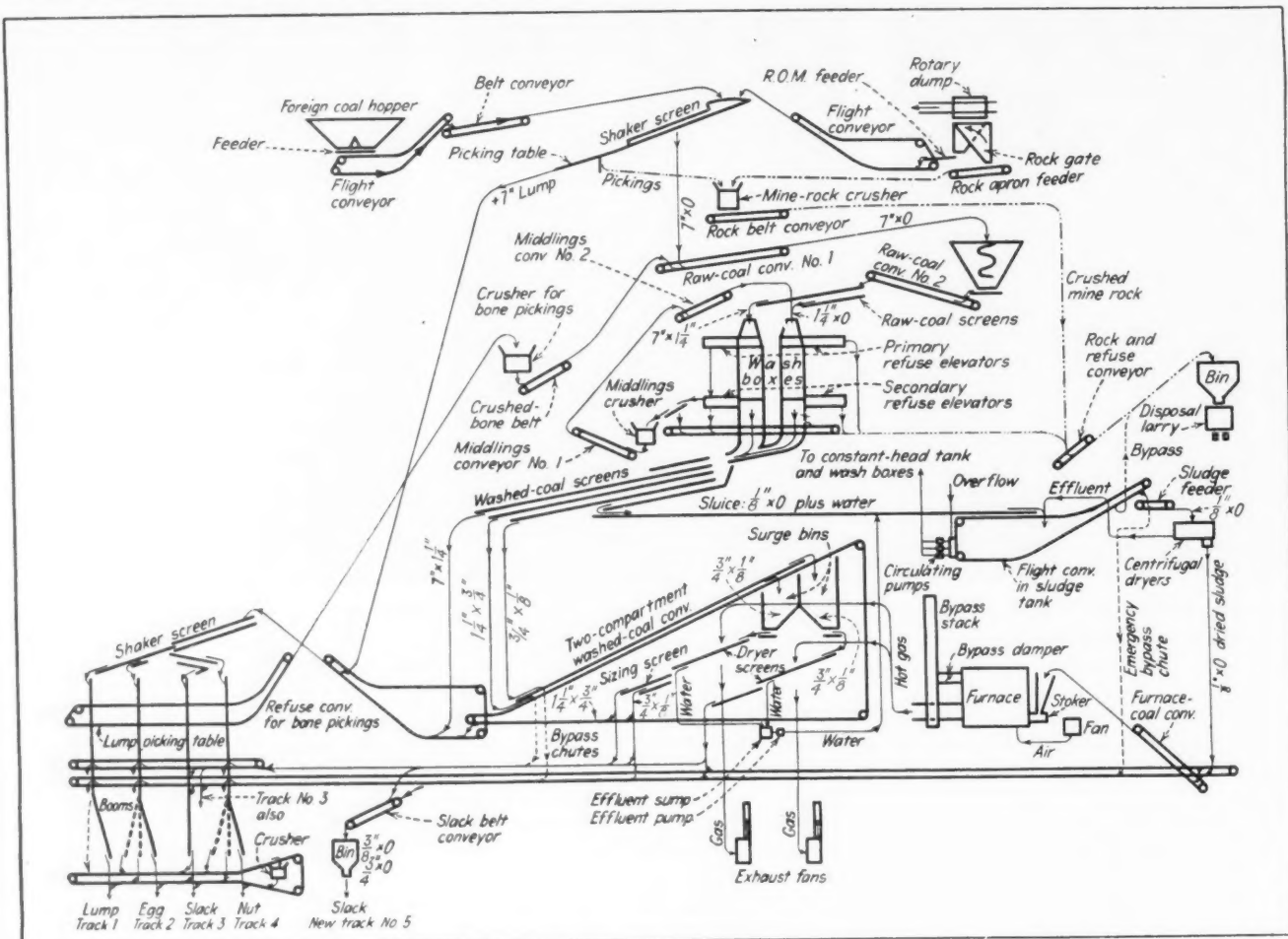


FIG. 1—FLOWSHEET, Piney Fork preparation plant as originally set up.

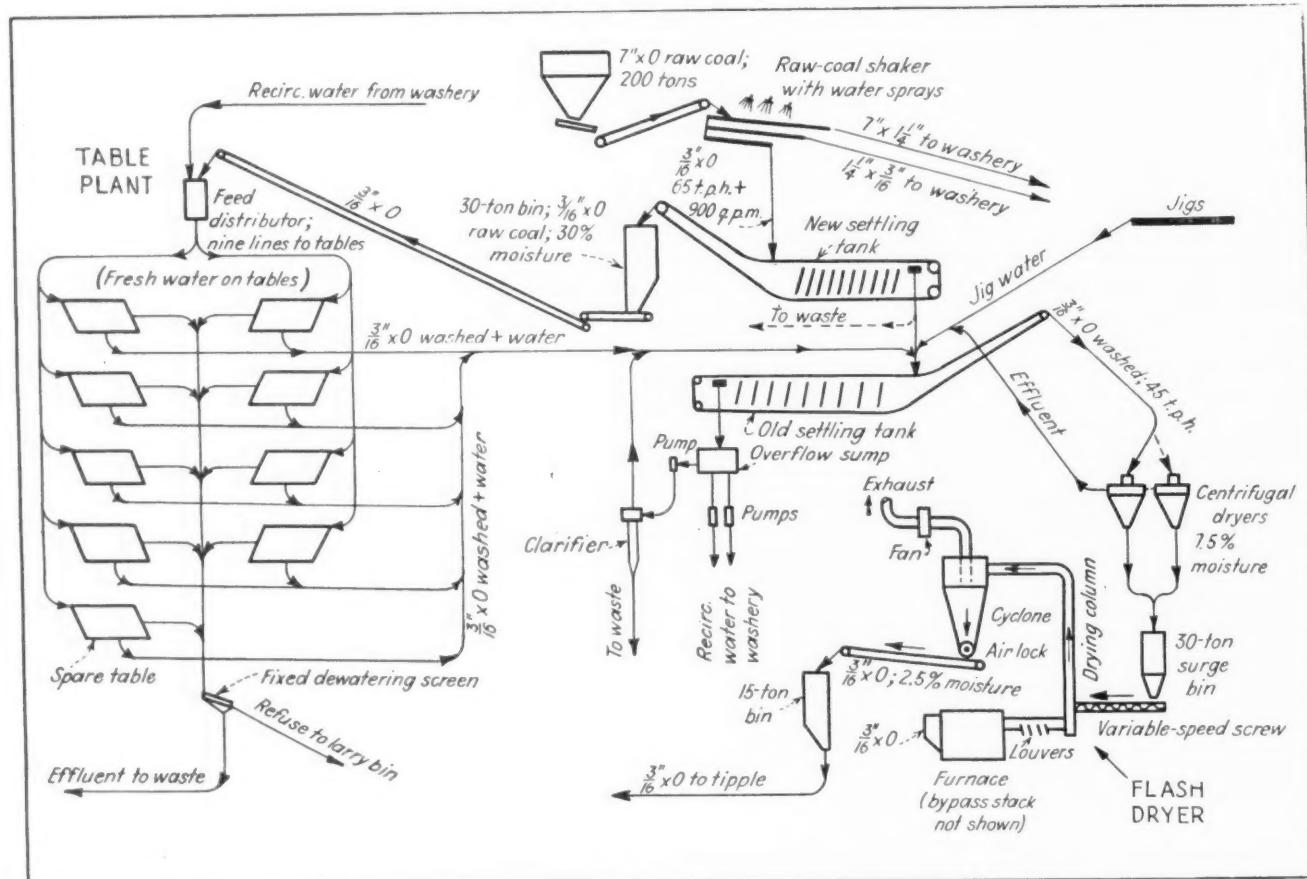


FIG. 2—FLOWSHEET, Piney Fork table and flash-dryer plants.

dried $\frac{3}{4} \times \frac{1}{8}$, forming a $\frac{3}{4} \times 0$ slack, with a combined surface moisture of 4.5 percent.

Water from the settling tank overflowed into a pump sump where two 3,500-g.p.m. Morris pumps recirculated the water through the washery system. Excess water overflowed to waste. This recirculating water has averaged 12-percent solids and there have been times when it has been as high as 24 percent. This high solids content, plus the necessity for avoiding stream pollution, has made it necessary to study possible methods of recovering these solids and reducing the solids content of the water system. One method being tried at Piney Fork will be described later.

The new table plant was installed adjacent to and on the same floor level as the Link-Belt jigs and the minus 7-in. run-of-mine shaker screen. A flowsheet of this plant, as well as that of the flash-dryer plant, is shown in Fig. 2.

Sprays Aid 3/16x0 Separation

The minus 7-in. raw-coal shaker previously described as feeding the two jigs was modified by installing a second deck with 3/16-in. round-hole stainless-steel screens. The screen also was equipped with numerous water sprays. In other words, the dry-screening shaker was turned into a wet-screening unit. It was found that the flat 3/16-in. round-hole screens were not efficient in passing through all the minus 3/16, largely because of insufficient wetting. A water trough on the top deck, plus a large number of sprays, has largely corrected this. Screen dimensions are 7x18 ft. and it is necessary to screen through 60 to 70 tons of 3/16x0 per hour. It is proposed to change these screens to slotted lip screens with openings equivalent to 3/16 round.

The raw 3/16x0, together with the spray water, aggregating 900 g.p.m. of plant recirculating water, is sluiced to a new rectangular concrete settling tank equipped with a double drag conveyor. This tank is 12 ft. wide and 8 ft. deep. Settling length is 64 ft., providing 768 sq. ft. of settling area. Drag speed is 5 f.p.m. and the conveyor discharges up a 40-deg. incline to a 30-ton surge bin. The tank is equipped with an adjustable-weir overflow. To aid in settling and in slowing up the water current, ten wood baffles are installed on 3-ft. centers. They are sloped 60 deg. in the direction of the drag conveyors

scraping the bottom. With 900 g.p.m. of water and 65 t.p.h. of coal passing into this settling tank, the overflow is approximately 800 g.p.m. containing 6-percent solids. It should be borne in mind that the water entering this tank is chiefly recirculating water from the main washery pumps. At present, 75 percent of this water is recovered and discharged into the original settling tank for re-use.

Distributor Feeds Tables

Raw coal from the drag tank, as stated, empties into a 30-ton surge bin. It is fed out of this bin by a constant-speed conveyor with an adjustable vertical gate controlling the height of coal on the conveyor, which in turn controls the feed rate to the tables. Table feed is carried up an inclined conveyor to a Deister Concenco revolving distributor with nine holes. This distributor is designed so that the flow out of each hole is the same, thus assuring an equal distribution to each of the tables. For proper pulp dilution, washery recirculating water is added to the feed in the distributor.

Nine Deister Concentrator SuperDuty Diagonal-Deck No. 7 tables are installed, although only eight are used at a time. This provides one spare and, by flipping the proper pipe elbow in the distributor, any one table can be cut out for necessary repair or adjustment. Long, sweeping 4-in. pipe bends with a slope of not less than $1\frac{1}{2}$ in. per foot carry the feed to each table. Fresh water is used as wash water on the tables, although recirculating water makes up the bulk of the pulp dilution. It is estimated that a total of 100 g.p.m. of fresh water is used on all eight tables, plus 400 g.p.m. of recirculating water in the distributor.

Table riffles and deck covering are made of rubber. This type of table also has been called Deister-Overstrom and is operated by a Concenco anti-friction bearing head motion of a modified pitman-and-toggle design. The speed is 265 r.p.m. and the tables at Piney Fork are presently operated with a $\frac{7}{8}$ -in. stroke. An elevation of 2 in. at the refuse end seems to give the best results with this particular feed. The slope is approximately 6 deg. Each table is handling 7 to 8 tons of 21-percent-ash 3/16x0 feed per hour, producing a 7.5-percent-ash clean coal with less than 1-percent float coal, at 1.40 sp. gr., in the refuse and 1-percent sink in the clean coal at 1.60.

Refuse from the tables discharges into a drag conveyor equipped with fixed wedge-wire dewatering screens, the effluent passing to waste. Washed coal, together with the bulk of the water from the tables, is sluiced to the old settling tank previously noted. This drag-type settling tank, as before, receives the water from the classifying screens following the jigs. The overflow, together with part of the new-tank overflow, is used as recirculating water in both the jig and table plants. To recover waste water from the old tank, as well as the new one, a new type of water clarifier has been in experimental operation for several months.

This clarifier is a form of cyclone thickener made by the Nichols Engineering & Research Corp. and called a Vortrap. It consists essentially of an especially designed headpiece fastened to a vertical length of pipe. The headpiece introduces the liquid-solid feed tangentially and imparts a swirling motion, the velocity of which depends upon the difference in inlet and outlet pressures and the diameter of the pipe. About three-fourths down the pipe a rubber diaphragm, or orifice, is inserted. This diaphragm apparently reverses the flow of inner clarified water but permits the solids to pass on down to an outlet pipe, where the rate of discharge is controlled by a valve.

Clarifier a "Water Cyclone"

The clarified water in the center of the pipe passes upward and out of the center part of the headpiece. Two sizes of Vortraps (4- and 8-in. diameters) have been experimented with at Piney Fork. As much as 250 g.p.m. has been handled with the former and 800 g.p.m. with the latter. The latter unit is rubber lined to prevent excessive wear. Inlet pressures with either size of Vortrap have been varied from 10 to 25 lb. per square inch, with outlet pressure preferably close to zero.

Solids in the Vortrap feed, or settling-tank overflow, vary from 8 to 18 percent on occasion, with effluent from the Vortrap carrying 5 to 12 percent solids and the discharge thickened to 50 to 58 percent solids. The feed consists of approximately 55-percent minus 100-mesh, of which 35 percent is minus 200-mesh. There is a tendency for the minus 200-mesh to concentrate in the effluent. In other words, the finer the size the more difficult the separation.

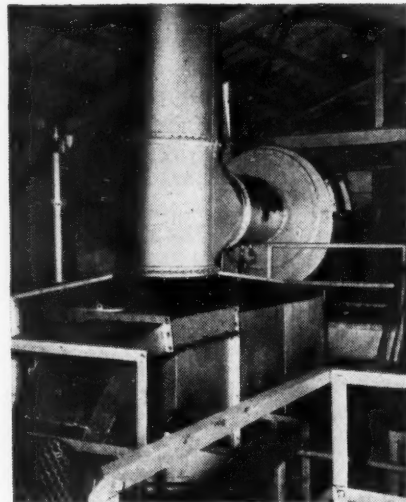
We feel that this clarifier, as well



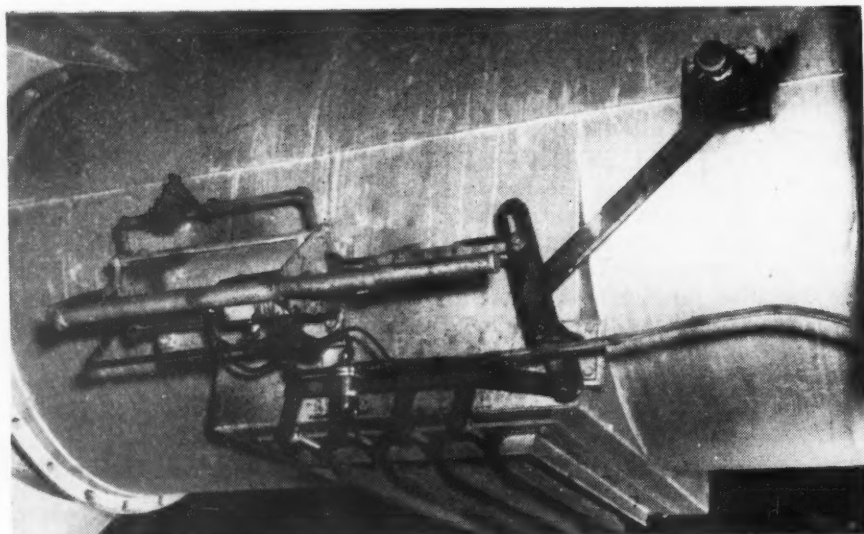
THE 3/16x0 COAL, after centrifugal drying, is stored in a surge bin preceding the flash dryer.



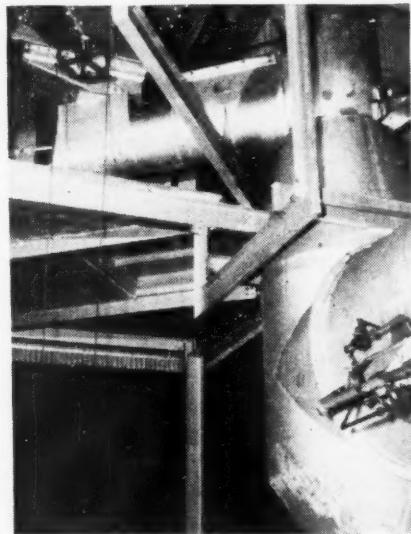
HARVEY POWLEY is in charge of the flash dryer on the second shift, operating from this control station.



INDUCED-DRAFT fan for pulling hot gases through the dryer. The 3/16x0 fines are dried in less than one second.



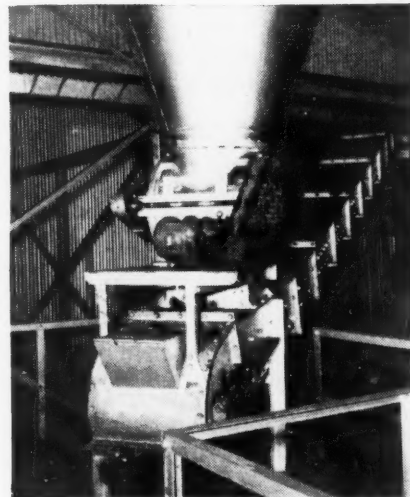
TEMPERING AIR for adjusting the temperature of the drying gases enters the louvers in the pipe connecting the furnace with the drying column. The temperature is controlled automatically by the temperature at the cyclone outlet.



WHERE THE centrifugally dried 3/16x0 in the upper horizontal trough meets the drying gases from the furnace.



RUSSELL WILMOT (left), Piney Fork mine superintendent, R. E. Zimmerman, preparation engineer, Hanna Coal Co., and author of this article, and S. A. Stone, engineer, Deister Concentrator Co.



DRIED 3/16x0, containing between 2.0 and 3.0 per cent surface moisture, goes to the main plant for mixing.

as other types of cyclone thickeners, hold considerable promise in helping solve slurry problems and believe that even better results will be achieved as further experience and knowledge concerning their use is gained. Our plan calls for using this type of thickener or clarifier for all our washery waste water, sending the thickened 50- to 60-percent-solids sludge to the table plant for recovery of usable coal or combining it with the plant refuse. Vortrap, or cyclone-thickener, effluent will be recirculated in the plant water system, resulting in a nearly closed circuit, except for refuse or tailing water.

Moisture Cut 22.5 Points

Clean coal from the table plant, after settling in the main washery settling tank, is dragged up, holding 30-percent moisture, and discharged into a C-M-I centrifugal dryer in place of the previous $\frac{1}{8} \times 0$. The bottom screen of the jig classifying shaker is now equipped with 3/16-in. screens also. The 3/16x0 passes through the C-M-I dryer, where surface moisture is reduced to 7.5 percent. Two of these centrifugal dryers are installed in the plant. One, however, is a standby unit. Effluent is discharged back into the settling tank. Feed rate to the C-M-I unit is 45 t.p.h.

The Link-Belt screen-type heat dryer now dries $\frac{3}{4} \times \frac{3}{16}$ coal, instead of $\frac{3}{4} \times \frac{1}{8}$, to as low as 1-percent surface moisture.

The C-M-I product — 3/16x0 washed coal with a 7.5-percent moisture—is conveyed to the flash-dryer plant, where it is discharged into a 30-ton surge bin. The product is fed by a screw conveyor, speed controlled by a Reeves variable-speed drive, into the bottom of the drying stack, where it is immediately swept up with the hot combustion gases of the furnace under the influence of the pull of an induced fan, and collected in a 12-ft.-diameter cyclone. The drying stack is 30 in. in diameter and 30 ft. high. It is made of stainless steel.

An air-lock device at the bottom of the cyclone permits the entrapped dried coal particles to be discharged onto a drag conveyor, where they are conveyed and mixed with $\frac{3}{4}$ - or $\frac{3}{8}$ -in. coal and sent to tipples for loading. Moisture and drying gases pass through the cyclone and the 900-r.p.m. 30,000-c.f.m. fan to the atmosphere. The fan is driven by a 150-hp. induction motor.

The flash dryer is manufactured

by the Raymond Pulverizer Division of the Combustion Engineering Co. It consists essentially of a stoker-fired combustion furnace, a vertical-tube drying stack, cyclone collector and suction fan. Two C-E spreader-type stokers feed 3/16x0 coal into the furnace at a rate of about 0.45 t.p.h. with a 45-t.p.h. feed to the flash dryer, equivalent to 1 ton of coal fired per 100 tons of coal to be dried. The furnace is equipped with a forced-draft blower, overfire air jets and a bypass stack for starting up.

The horizontal duct leading to the coal-drying stack from the furnace is equipped with a series of louvers, or vanes, which permit the entrance of atmospheric air to temper the combustion gases before they pass up the vertical drying column. A recording pyrometer registers this "inlet" heating temperature.

The "outlet" temperature of the dryer is taken at the outlet of the cyclone by a thermocouple connected to a Brown electronic potentiometer recorder with air-operated controller actuating a Brown power cylinder operating the air-tempering louvers previously mentioned. By setting the potentiometer to the desired "outlet" temperatures, the inlet temperatures of the drying system are controlled by the quantity of atmospheric air permitted to pass through these louvers.

Surface Moisture 2.5 Percent

The "outlet" temperature will depend upon the feed rate, moisture in the feed and desired moisture in the product. With a feed of 45 t.p.h. containing 7.5-percent surface moisture, and with a surface moisture in the product of 2.5 percent, the "outlet" temperature is 115 deg. F. With this condition, the "inlet" temperature will be 700 deg. F. Hays Type "D" gages register the fan-inlet suction and the suction at the bottom of the cyclone. Under the conditions previously stated, 16 in. of water-gage is registered at the fan inlet and ± 15 in. of suction at the bottom of the cyclone. All instruments are mounted on a central control panel.

The cyclone is lined with 2 in. of Gunit cement made up of four parts minus $\frac{1}{4}$ -in. trap-rock aggregate and one part alumnite cement. The primary purpose is prevention of wear. At the 90-deg. elbow of the drying stack leading into the cyclone, the top side of the turn originally was protected by 6 in. of refractory cement. This, however,

eroded rapidly and was replaced by a 1-in. curved manganese-steel plate. This plate has now been in service over four months.

The flash dryer, as well as the screen-type heat dryer and the centrifugal dryers, are operated by one man per shift. So far, maintenance on the flash dryer has been negligible.

It is entirely possible to lower the flash-dryer product moisture to less than 1 percent. If extreme dryness is desired, however, it will be necessary to install a secondary dust collector in the circuit to prevent dust loss. By holding the moisture to 2.5 percent at Piney Fork, it is possible to operate with but one cyclone. This dryer has satisfactorily handled 60 t.p.h. of 3/16x0. It has, experimentally, handled like tonnages of $\frac{3}{4} \times 0$. With the coarser feed, however, considerable degradation occurs.

Summarizing this description of the Piney Fork table and flash-dryer plant, it can be said that The Hanna Coal Co. has been successful in achieving its goal of obtaining a superior fine-coal product that can well meet competition wherever fine-sized coal is used. A uniform low-ash and moisture-free coal is obtained and, at the same time, better washing efficiencies have resulted in a higher yield for the preparation plant as a whole.

The new plants were erected by the company's own construction crew under the direction of Russell Campbell, construction superintendent. Much of the final setting up of machinery was performed by the Piney Fork maintenance crew, supervised by Okey Howard Jr., plant maintenance foreman. Russell Wilmot is plant and outside superintendent. Allen & Garcia Co., Chicago, made the layout and detail design of the plants in accordance with flow diagrams and specifications of The Hanna Coal Co.

Executive and general officials of The Hanna Coal Co. (subsidiary of Pittsburgh-Consolidation Coal Co.) include:

R. L. Ireland Jr., president.

James Hyslop, executive vice president.

James D. Reilly, operating vice president.

A. A. Jenkins, sales vice president.

Norman Prudent, general manager, underground mines.

J. S. Harmon, general superintendent, strip mines.

Andrew Hyslop, chief engineer.

R. E. Zimmerman, preparation engineer.



ONE OF THE SEVERAL 40-CU.YD. power shovels extending stripping range and providing increased capacity in bituminous work.

Strip Progress Accelerated

Shovel Dippers up to 40 Cu.Yd. and Increased Installation of Big Draglines Meet Problem of Low Cost with Higher Wages and Thicker Overburden—Use of Power Extended

STRIP MINING has grown to where it accounts for one-fifth of the national coal tonnage. With the growth in output, the task of getting it also has grown harder. Thicker overburden in many regions is the big problem. This—and the task of keeping down cost in the face of substantial wage increases—are responsible for increasing activity in the development of shovels and draglines capable of handling thicker overburden at the same or a lower cost, and for the development of machines more suited to the varying

problems encountered, particularly in outcrop stripping.

Power is being applied to more and more operations around strip mines, including such things as handling cables and pole setting. More rehandling of spoil and tandem operation of shovels and/or draglines are helping to extend machine range.

Installation of at least three 40-cu.yd. shovel dippers and one 30-cu.yd. dragline bucket have marked stripping progress in the past year or so. Coupled with new front ends using alloy steels and redesigned to

reduce weight, the new 40-yd. dippers provide substantial capacity increases and greater operating ranges. One manufacturer offers the following comparison:

	35 Cu.Yd.	40 Cu.Yd.
Boom	105 ft.	120 ft.
Dipper handle ..	57¾ ft.	60½ ft.
Maximum dumping height ..	75 ft.	80 ft.
Dumping radius at maximum height	113 ft.	116 ft.
Maximum dumping radius ..	116 ft.	120 ft.
Bail pull, max...	100%	100%
Cutting effort at lip	100%	133%
WR ¹ —average ..	100%	104%
Weight, dipper, bail, handle ..	100%	96%
Weight, boom, stiff leg and crowding handle	100%	82.5%



A 25-CU.YD. ANTHRACITE DRAGLINE, one of a growing number of units up to 30 yd.

Now that the 40-cu.yd. dipper is an actuality, speculation is turning to the possibility of even larger units—50-cu.yd., for example. The problems involved, however, apparently are not nearly as easily solved as those overcome in going from 35 to 40 cu.yd. As some stripping men see it, a 50-cu.yd. machine would require radical design changes and might cost as much as twice the largest present machine erected and ready to go. In the opinion of these men, solving the new design problems would require, among other things, raising voltage from 4,000 to 6,000. Thus, while it is felt that a 50-yd. machine is not beyond the realm of possibility—and might not be too far in the future—it will require considerable exploration in new design fields.

Thicker overburden naturally brings in the question of room for spoiling, in turn involving design for greater dumping heights and ranges. For that reason, among others, the big walking dragline with a longer boom—up to 250 ft.

—is coming more and more to the fore in both anthracite and bituminous stripping. Machines with 25-cu.yd. buckets are now common in both industries and, as previously pointed out, a 30-cu.yd. bucket has lately been delivered to a strip-mining company. The number of mines using such machines as the only stripping unit has shown a sharp rise in the past year or so and will increase still more in the future.

New power units and controls now enable draglines to come even closer to handling as much yardage as shovels with dippers of the same capacity in spite of substantial increases in boom length, thus cutting down yardage cost. Some anthracite operators expect to go 90 ft. or more deep where the coal has been first and second mined and 120 ft. or more in virgin coal with their 25-yd. draglines. In bituminous stripping, with usual seam thicknesses, depths of 60 to 80 ft. or more are contemplated with such machines, or 10 to 15 ft. more than

usually is attempted with shovels, even on sharp outside curves.

Where the shovel already is the main stripping unit, or shovel operation in new pits is desirable for other reasons, deeper overburden naturally involves some means of helping the shovel out. The dragline is the old reliable under such circumstances. Other and, in some cases, newer units include the big scraper, now obtainable in capacities up to 30 cu.yd., as well as certain special machines. One is the wheel excavator—a series of small dippers on a revolving wheel discharging to a conveyor-type stacker system, the whole mounted on a crawler base and used for taking off top soil and soft shale. At least one new wheel excavator is scheduled for immediate construction.

A second special unit is the so-called "tower machine," consisting of a drag scraper operating between two self-propelling towers, one on the bank and one on the spoil, the scraper cutting down the height of the bank and dumping far back on the spoil, thus lightening the task of the shovel. One company was completing erection of a second tower machine when this was written.

Smaller Units Go Deeper

Operators using smaller equipment, particularly in outcrop stripping in the East and South, also were facing the problems of getting more coal out of a given site by going deeper. They also were buying shovels with larger dippers and longer ranges, while the ranks of those using draglines or scrapers in tandem with shovels were increasing. Stripping with big scrapers alone kept pace with advances in other directions. One of the tricks worked out by such operators was scraping out a shallow trench at the back of each cut to give the bulldozers used in conjunction with the scrapers a better opportunity to push off the top soil.

Methods of extending the range of small shovels included tandem and "two-pass" operation. Using a lead shovel to throw part of the spoil further back and a second following shovel stacking against the first spoil row was claimed to increase spoiling capacity enough to make practical an increase of up to 5 ft. in the overburden thickness handled. A similar increase is cited for the two-pass method. As practiced at one mine, a bulldozer knocks the top of the bank into the pit, making a ramp about 10 ft.



HAULING SPOIL at a bituminous stripping operation—another recent exception to the formerly rigid rule against any handling or rehandling of spoil in open-cut work around soft-coal mining operations.



TWO-LEVEL DRILL for overburden with positions for one high- and two low-level drilling machines, making possible the drilling of three holes simultaneously.

high over the coal, on which the shovel works in making its first cut. Thus, the shovel can throw the spoil further back and pile it higher, thereby increasing spoiling capacity. After completing the top cut, the shovel makes a second pass to clean out the ramp and complete uncovering the next cut, piling the spoil against the previous row.

Methods of extending the range

of draglines included ramping out into the pit at intervals, involving rehandling of this particular material. Benching off and piling along the edge of the remaining high wall also grew in popularity, although requiring rehandling of that certain portion of spoil along the high-wall edge in removing the bottom bench. This is offset, however, by an increase in possible stripping

range and depth. The key cut along the back line continued to claim its adherents. Where the top soil or gravel contains considerable water, a number of dragline operators adopted the practice of using the machine to cut a ditch at the back of the bench to collect drainage for pumping, thus keeping it from going on down into the pit.

While casting continued almost a hard-and-fast rule in bituminous stripping, the ice has been broken at some operations, notably one using crawler-tread wagons pulled by tractors. Anthracite, however, continued to rely on hauling spoil away from basins or other locations where it was desired to go below usual casting range for either shovels or draglines. In one big new project, involving moving some 79,000,000 cu.yd. from depths up to 390 ft. to recover some 14,000,000 tons of coal, stripping will be about evenly divided between 25-cu.yd. draglines and shovels and trucks. The majority of the trucks used are 22-ton end-dumping units with 250-hp. diesel engines.

For shovel tending, the past year or so has witnessed a strengthening of the trend toward the use of smaller rubber-tired tractors and blades. Big rubber-tired tractors, stated to be faster and more maneuverable, also have been introduced to handle the heavier earth and rock-moving jobs, although the crawler tractor remains the king in this heavier work.

In overburden preparation the trend toward bigger holes has strengthened. Vertical augers and



BIGGER AUTOMOTIVE UNITS, such as this 22-ton end-dump unit at an anthracite mine, feature haulage improvements at strip-mining properties.

rotary-type drills have gone into additional operations and the list of those using liquid oxygen for overburden breaking has increased. The new insert-type bit has met with increasing favor. Development of the two-level horizontal drill continued. A new model now in service has positions for three drilling units—one on the top and two on the bottom. Standard horizontal drills also have felt the influence of labor-saving pressure. In addition to the use of power for more motions, models now are offered to drill up to 12-in. holes 150 ft. deep—at a 40-percent faster rate.

Along with larger holes and more care in positioning of charges, some recent shooting developments have included use of copper detonating tubing in vertical holes, particularly where the charges are divided. Advantages include a detonating shock all along the entire explosive column, or columns, increasing the effectiveness of the charge. In addition, some operators have adopted the practice of putting in an occasional faster cartridge to increase the detonating shock still more.

Use of milli-second delay detonators which permit multiple shooting but at the same time permit one hole to relieve the next, has been increasing. This system is cited as being particularly advantageous where both high and low holes are employed. Along with these other developments has been strengthening of the trend toward turning shooting problems over to agents of the explosive manufacturers. Since expert talent thus becomes more

available, better results are cited by operators using this plan.

The shovel remains the principal loading unit at strip mines. At least one small rubber-tired unit was in service. Otherwise, the crawler mounting still is standard. Special loaders being used in increasing numbers include units mounted on crawler tractors. Pinning of coal in preparation for shooting apparently has grown in certain areas, notably in the Southwest, and at least one operation has developed a scissors-type breaker designed for insertion in drillholes, after which the jaws are spread by a compressed-air cylinder.

Truck Size Increasing

Automotive haulage, now practically standard in coal stripping, is distinguished by constantly increasing size of units, whether of the straight-truck or semi-trailer types. Straight trucks in 15- to 20-ton capacities now are fairly common, while the proportion of 30- to 40-ton semi-trailers is increasing. The 80-ton semis put in service at certain operations several years ago still remain the largest, however.

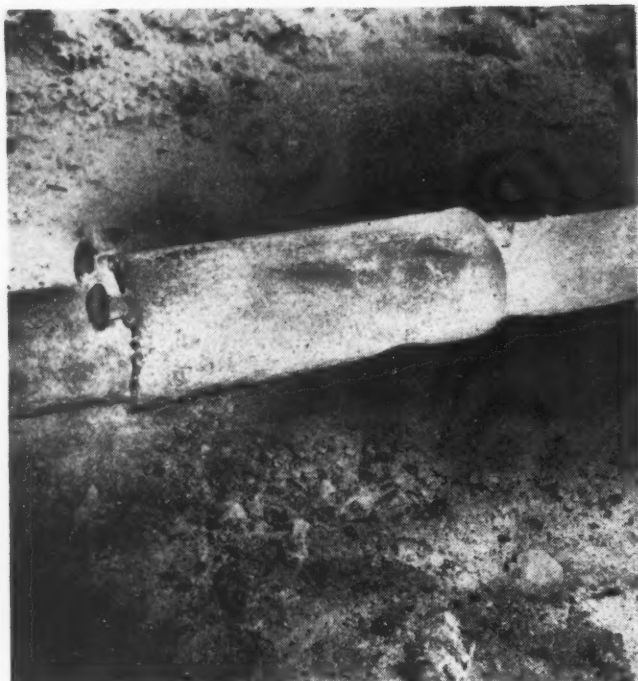
Since hoisting mechanisms on straight trucks involve constant hauling of considerable weight, additional operators are going to plain hinged beds, installing overhead hoists at dumps to lift the beds to discharge the coal. These installations are in addition to those involving tilting platforms, which tip the entire truck to dump.

While gasoline (particularly for smaller trucks), butane and butane-propane mixtures continued as major truck fuels, the trend to diesels has picked up momentum in the past year or so. Although the cost of diesel fuel is rising, it is expected that a fair differential between it and gasoline will continue, thus maintaining that advantage, as well as the others offered by the diesel.

Increased use of ground-protective systems and unit substations have marked power developments in stripping. Recently, also, some operators have embarked on an intensive study of methods of protecting 440- and other low-voltage lines. In addition, some organizations have moved to simplify the problem of supplying low-voltage equipment, particularly in isolated sections, by installing portable diesel generating sets.

Improved shops and use of a wide variety of service units—trucks, cranes, and so on—have marked maintenance developments in stripping. In addition to repair, welding, crane, and lubricating and wrecking trucks, other special units are fuel trucks, cable-handling trucks, portable floodlights, heavy multi-wheel supply and equipment carriers and special light all-wheel drive trucks with winches either fore and aft, or both, for miscellaneous jobs. Changes in machine design for better maintenance have included such things as torque limiters in the crawler drive shafts on big shovels. Starting small engine-driven shovels in cold weather has been facilitated in some instances by electric strip heaters on oil pans, carburetors and at other strategic locations. Castings on the walking mechanism on large draglines also are being heated to reduce the possibility of breakage. Cold weather operation also is being facilitated by adoption of regular type snowplows for keeping roads clear.

Substitution of power for hand work also has been extended to such operations as building pole lines. Now, certain mines are employing power auger units for making pole holes. One type is permanently mounted on a truck. Another is a separate unit that can be towed, releasing the truck for other service when hole digging is not going on. Setting poles also is facilitated by cranes at some mines. These, plus power hole digging, plus other mechanized operations, cut construction of pole lines to a small fraction of that formerly required.



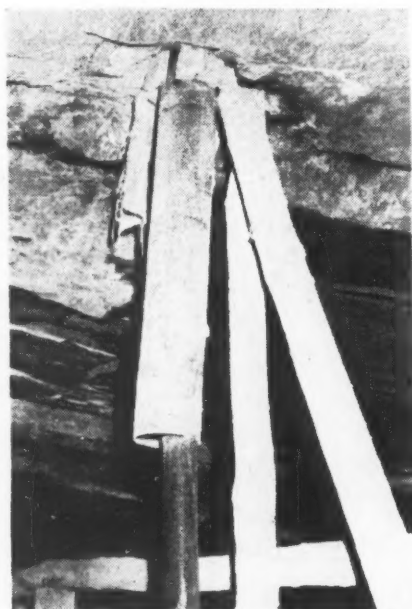
SLEEVE 12 in. long, cut from 4-in. pipe, is wedged over butt joint by track spikes lightly spot welded to sleeve. One run of 800 ft. of pipe included two curves.



VAULT with cover removed for photographing junction box resting unanchored on pedestal so it can be pulled out on bottom for opening cover and pulling disconnects.

Pipe Protects 2,300-Volt Cable

Quick Recovery and Low Installation and Moving Costs the Goals in 2,300-Volt Cable Installation at Consol No. 38 — Cable Placed in 3-In. Pipe With Sleeve Joints and Pulled Through by Mine Locomotive



THE 3-IN. PIPE protecting the cable along the haulway is curved upward and extends 3 ft. into the 6-in. casing.



BOREHOLE cable suspension requiring no foundation or fence at No. 63 mine. The No. 38 suspension is the same.

THE SPEED and concentration characterizing mechanical mining have put emphasis on the problem of quick recovery of high-voltage distribution cables in underground passageways, as well as on costs of installing and moving. Those new factors now assume equal importance with the safety and reliability that heretofore were dominant. After 2½ years' experience with a new method of conducting 2,300-volt power in Mine No. 38 Barnesville Shaft, Consolidation Coal Co. (W. Va.), the conclusion is that it is an improvement for the conditions at that operation on the outskirts of Fairmont.

The three-conductor cable, with synthetic rubber sheath, is installed on the mine floor next to the rib on the clearance side of the haulway. It is protected by a 3-in. steel pipe that is not buried or covered except where the track crosses headings. Instead of being put together with threaded couplings, the 20-ft. sections of the pipe are butted together and the joints covered by a loose-fitting sleeve of 4-in. pipe 12 in. long. The sleeve is secured in place by driving four track spikes as wedges between the pipe and sleeve. The spikes are spot-welded lightly to the sleeve to prevent



TO INSTALL this cable support after fabrication in the shop, it is simply slipped over the top of the casing. Cable terminal and open wiring are out of reach, saving cost of a fence.



IN NO. 38 MINE: L. E. Hetrick (left), mine foreman, Sam Pellerite, electrical engineer, maintenance; Russell W. Morris, maintenance foreman; and H. B. Wickey, superintendent.

loosening of the sleeve or pipe.

Clearance between the pipe and the sleeve is such that two $\frac{1}{2} \times \frac{1}{2}$ -in. 30-lb. track spikes, spaced about 2 in. apart, make a tight fit. Recovery after removing the cable will be done by breaking the small spot welds with a hammer and pulling the spikes.

This cable, which carries 2,300-volt power, extends 1,600 ft. along the haulway from the bottom of a borehole to a portable rectifier substation put into use May 31, 1945. At the midway point the two sections of cable are joined at a junction box placed in a vault built into the rib on the clearance side.

In planning the job considerable discussion took place as to the easiest way to install the pipe and cable. A method recommended by Russell W. Morris, maintenance foreman, was adopted. As each 20-ft. length of 3-in. pipe was laid, a $\frac{1}{2}$ -in. wire rope was pulled through it by hand. Upon completion of a section or run, a mine locomotive was hitched to one end of the $\frac{1}{2}$ -in. wire rope and the electric cable to the other end. The locomotive then pulled the rubber-sheathed cable through 800 ft. of pipe without difficulty. One of the 800-ft. runs was straight but the other included two long-radius turns, one of 90 deg. and the other 45. To reduce wear on the cable as it entered the pipe, a heap of rock dust was kept piled over it at the entering point.

Bending of the 3-in. pipe for the turns was done on the spot, using a bender made in the mine shop from a 6-ft.-long I-beam and a 5-ton hydraulic jack. The 90-deg. turn, with a radius of about 60 ft., required the bending of five joints of pipe.

Inside dimensions of the vault are: length, 5 ft.; height, 3 ft.; depth, 3 ft. It has a concrete floor, tile sides, steel top and steel door. The junction box sits without anchorage on a pedestal of tile. If it is necessary to open the box, it is lifted down off of the pedestal and pulled out on the mine floor in front of the vault. This is possible because the 3-in. pipes terminate in the vault walls and the upward sweep of the cables provides slack.

This junction box is a G. & W. Type H Catalog No. H2342 unit with rubber-gasketed moisture-proof top. The rating is 5 kv. 250 amp. It contains three disconnecting blades that are tightened in the clips by individual clamping screws. The hot hook furnished with the box includes a wrench for operating the cap screws. Safety grounding of the box consists of connections to ground wires in the cable.

Depth of the borehole through which the cable enters the mine is 540 ft. Its 6-in. casing extends 5 ft. below the mine roof and the 3-in. pipe protecting the cable underground extends 3 ft. up into the casing. At the top of the borehole, the cable is supported by the three

conductors, with individual strain insulators fastened to a steel plate carried on top of the casing. Since the casing extends about 10 ft. above the ground, this arrangement puts the cable terminal and open wiring up out of reach and saves the cost of a fence. This cable support is the second of its type installed by the Consolidation Coal Co. (W. Va.). The first was devised for a borehole feeding Mine No. 63, Monongah, where the right-of-way did not include space for a fenced enclosure. These cable supports were made in the central shop and installed by hoisting them up and slipping them over the tops of the casings.

Specifications of the General Electric cable used in the borehole and in the pipe along the underground haulway in No. 38 Mine are: three-conductor, No. 4/0, stranded, alloy-coated, 10/64-in. Buna-S heat-resisting synthetic-rubber compound per A.S.T.M. No. D-754-43T, colored tapes on each conductor, three copper ground wires, rubber fillers 10/64-in. Buna-S tough synthetic-rubber sheath per ES-6A, 5,000-volt; outside diameter, 2.24 in.; weight per 1,000 ft., 5,567 lb.

H. B. Wickey is superintendent of No. 38 Mine. It is a shaft operation opened 75 years ago. After a shutdown during the thirties it was reopened and has been modernized with mobile loaders.



TWO SPRAYS wetting the coal during loading by a crawler-mounted machine. Air clarity shows the effectiveness of the wetting.



AIR CLEARNESS with universal cutting machine (picture taken during operation) shows effectiveness of coal-dust control.



WATER-EQUIPPED shortwall in operation. Clear air shows the absence of dust.

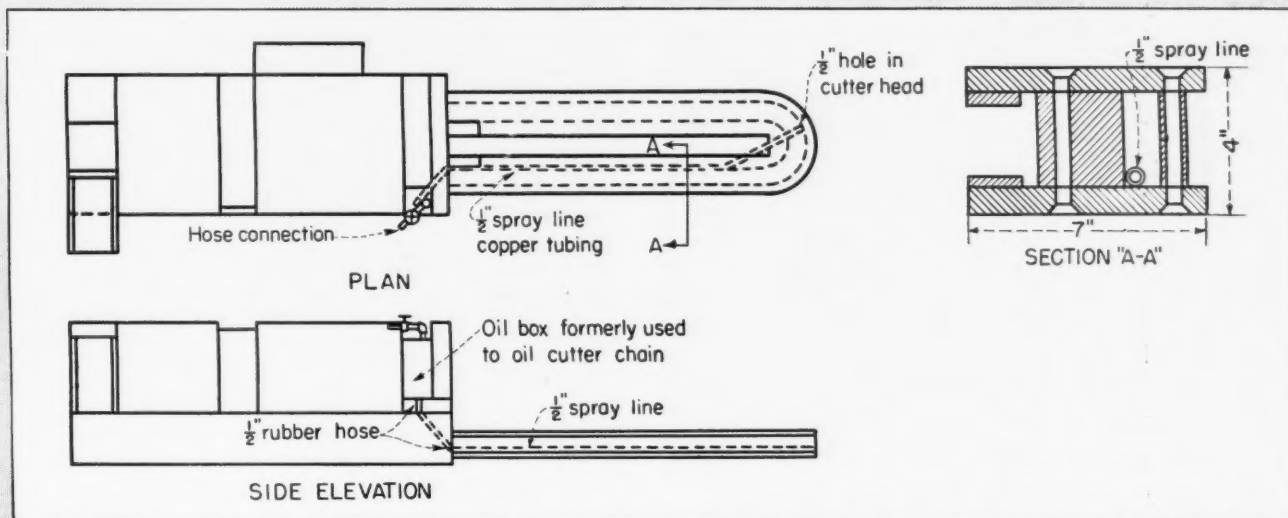


UNIVERSAL MACHINE cutting near the top. Cuttings adhering to the face and to the bar show the results that can be obtained.



HAND DUSTING the coal rib in a working place (left) secures good results. By throwing the dust as shown on the ribs and roof, spillage has been found sufficient to properly dust the bottom. At the right is a machine dusting a haulageway.





BASIC DESIGN for equipping a mining machine with a water spray from drawing originally prepared in 1922. All cutting machines are provided with similar equipment.

Controlling Dust at Coal Mines

Face-Preparation Methods to Reduce Dust Production in Coal Mining—Controlling Dust at the Face and Elsewhere by the Use of Water and Rock Dust—Dust-Control Measures in Preparation Plants

By JAMES C. GRAY

General Superintendent, Coal Mines, Tennessee Coal, Iron & R. R. Co.,
United States Steel Corp. subsidiary, Pratt City, Ala.

THE NEED for controlling dust in coal-mine operations is aptly stated in a report by the Bureau of Mines, Mar. 25, 1947, which included the following sentence: "The outstanding lesson to be learned from this disaster is that mines which lib-

erate little or no methane are not immune from widespread and tragic explosions if dry and dusty conditions exist therein and adequate measures are not taken to control the dust hazard."

The Tennessee Coal, Iron & R. R.

Co. operates five mines in the Warrior Coal Basin of Alabama, northwest and adjacent to Birmingham. Another mine is presently being developed in the same field. The output from the five producing mines is approximately 20,000 tons per day tippable weight. All the mines are mechanized, using shaking conveyors, some of which are equipped with duckbills for loading in thin-seam work, and trackless-mining equipment where height of seam and grades permit. Modern shortwalls are used for cutting coal for conveyor loading, and universal machines, both crawler and rubber-mounted, are used in trackless operation where crawler-mounted loading machines load into shuttle cars.

FACE PREPARATION—So you mechanized? Did you use cleaning equipment before mechanizing? If so, has anything happened to the quality of your finished product or to your size yield? We have noted a very considerable change resulting from an increase of 65 percent in the 14-mesh material in the run-of-mine product since mechanization. Not all of this increase grows out of a different method of loading. Instead, it can be credited to a letup in good mining at the face. We no longer have the same con-



WATER DISCHARGING through the bar of a rubber-mounted universal cutter effectively eliminates dust.

Abstract of a paper presented at the 25th Annual Safety Congress of the National Safety Council, entitled "Control of Coal Dust in the Operations of the Tennessee Coal, Iron & R. R. Co."

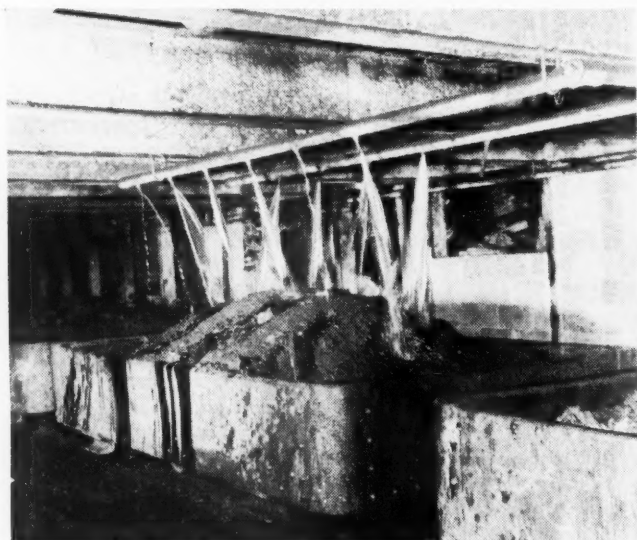
DUST-CONTROL IN HAULAGE AND PREPARATION



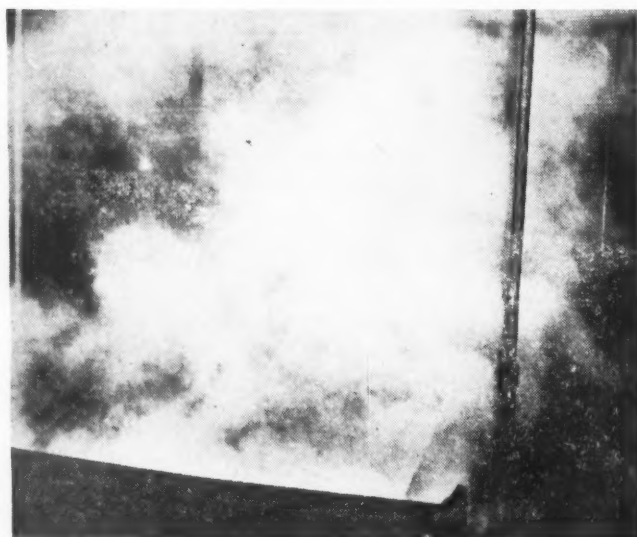
DRENCHING spray at a mine-car loading point. Variations are used at all such loading stations.



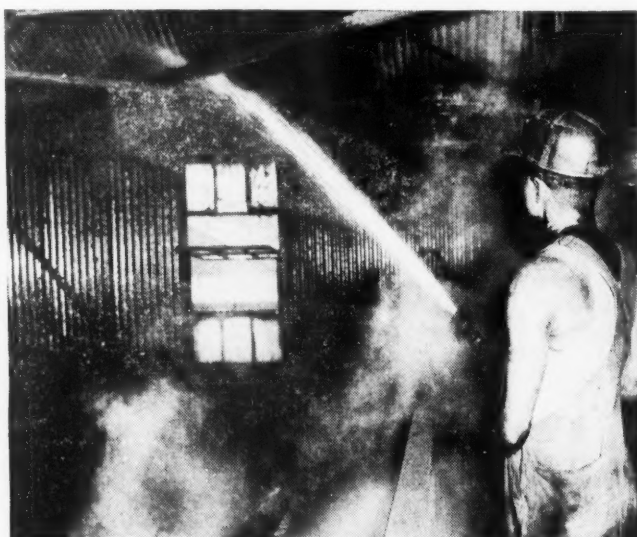
FINE SPRAYS, although not visible in this picture, have been found most effective at the rotary dump at Short Creek mine.



HAULAGE SPRAY (left) in operation drenching the tops of cars in transit. A second spray installation (right) repeats the treatment prior to dumping as a further step in controlling dust in handling.



A **STEAM JET** controls dust as the coal is delivered to the surface preparation plant.



WASHING DOWN part of the crushing plant during operation to prevent dust accumulation.

Spray-Line Footage at T. C. I. Coal Mines

	Pipe		Size, Inches				
	6	4	3	2½	2	1½	¾
Hamilton	19,150	13,250	.....	.....	56,750	8,000	
Edgewater .....	.....	48,350	1,150	.....	40,300	8,000	
Short Creek	4,000	3,000	.....	.....	20,800	.....	3,100
Wylam-Pratt .....	.....	.....	8,100	.....	4,300	3,800	
Wylam-America .....	.....	.....	7,500	.....	15,400	8,400	
Docena	7,300	2,400	11,500	.....	74,300	11,300	
Total	11,300	24,550	73,100	16,750	20,800	191,050	42,600

trol over the quantity of powder consumed per ton of coal mined as with hand-loading methods.

Soon we shall have completed the establishment of cutting, drilling and shooting standards for all face conditions in our mines. These standards are presented in diagrams readily understood by all supervisors and workmen. It is a simple matter to measure how near we come at the end of the month to meeting those standards. Thus, we hope to get the best start possible in the control of coal dust, which is to minimize the quantity we have to control. If you haven't given this phase of dust control real attention, it is recommended that you do so. You may also find that the loading machine will perform more efficiently when loading from a properly shot face than from one that is overshot.

USE OF WATER—When the writer was first employed by T.C.I. in 1937, the spray-line system making water available to all working places in each mine to allay coal dust made a deep impression. The outstanding feature was the hollow bar on all mining machines that permitted piping water to the cutter-head on the end of the bar, thereby killing coal dust at its principal source. Put enough water to the cutter-head and you can forget all about the interfacial tension between coal and water. You need not be concerned, at least at this point, with full-cone, flat-spray, misting or atomizing nozzles, or any modifications thereof. Wet the coal until a handful will ball readily under slight pressure. Then, the cuttings are under control. This is and has been the practice on all mining machines since 1922, when the method was first developed and installed on a machine in the Edgewater mine. This method is superior to any other encountered by the writer, not only because it controls the dust at the face during the cutting operation, but also because all the cuttings are wetted, and no dust is created when they are load-

ed, transferred and hauled to the surface. Furthermore, it is equally effective for all methods of cutting the face whether bottom, top or shear.

Other uses of water to control coal dust include:

1. Spraying during the operation of all loading machines through nozzles attached to the machine so that the spray extends over the gathering head of the machine.
2. Spraying shuttle-car roadways when necessary.
3. Spraying the material as it is transferred to the mine car from the conveyor or shuttle car.
4. Spraying loaded cars at convenient points enroute to the underground dump.
5. Spraying immediately before and during the dumping operation.

All water for allaying dust is obtained from the underground workings. In some cases, the sprinkling lines are connected directly to the pump lines. In others, the underground water is pumped to a reservoir or tank on the surface and then fed to the sprinkling lines, relying on the head to provide the necessary pressure. The water is not treated at any of the mines.

To accomplish the foregoing, an inventory Jan. 1, 1947, showed approximately 72 miles of pipelines of various sizes in the five operating mines. In addition to allaying dust, the spray system has been of immeasurable value in extinguishing fires.

USE OF ROCK DUST—All working places are rock-dusted by hand as they are advanced. Present company standards require this to be done to within 20 ft. of the working face. It is further required that all crosscuts be rock-dusted immediately following loading of the last cut.

Rock-dusting also is done with a track-mounted high-pressure machine. It is done on the third shift where the mine is scheduled for two operating turns per day and on the week-end off-shifts where the mine is scheduled for three operating

turns per day. Provisions are made at overcasts and in stoppings at about 300 ft. intervals on main slopes to dust trackless air returns.

To maintain compliance with approved standards of incombustible content, field samples are collected at regular periods and analyzed in our own laboratory. The results are used as a guide in the scheduling of future rock-dusting activities. Every shipment of rock dust received is sampled and tested for size to assure maintenance of the specification of 70 percent through a 200-mesh screen.

Approximately 10 lb. of rock dust has been distributed for every ton of usable coal removed over the past several years.

DUST-CONTROL MEASURES IN PREPARATION PLANTS—

Live steam is blown onto the coal as it enters the crushing plant. This has been the practice for the past year and has been found more effective than a water spray in controlling dust. It also keeps the moisture content down, as compared to the use of water sprays, until the material has reached the wet-cleaning units in the preparation plant. Dust is further controlled in these plants by washing them down each shift where possible.

There are many points where washing cannot be done without protecting the electrical equipment. At such places, washing down is not as frequent, but it is performed at intervals. This question will be given more consideration in the design of the preparation plant at the new mine.

A survey was made at the company's coal mines in 1942 by the Division of Industrial Hygiene of the Alabama State Health Department. The survey proved conclusively that if the practices heretofore reviewed are strictly adhered to it is possible to keep within a maximum limit of 20 million particles per cubic foot of air at the working faces under our seam conditions. That the practices have merit was forcefully demonstrated in 1941 when a methane explosion at the Docena mine caused the loss of five lives. The report on this disaster stated that the propagation of the explosion by dust was arrested by:

1. Liberal rock-dusting by hand while driving the entries, with subsequent dusting of the slope by machine.
2. The use of water on the mining-machine cutter-bars, with the result that the dust on the bottom remained damp as the face advanced.



RUBBER-TIRED coal loader for seams down to 30 in., with loading head partially extended, discharges to a chain-type room conveyor. Loading boom is anchored by hydraulic jack at the left side of the conveyor.

New Loader Works Thin Seam

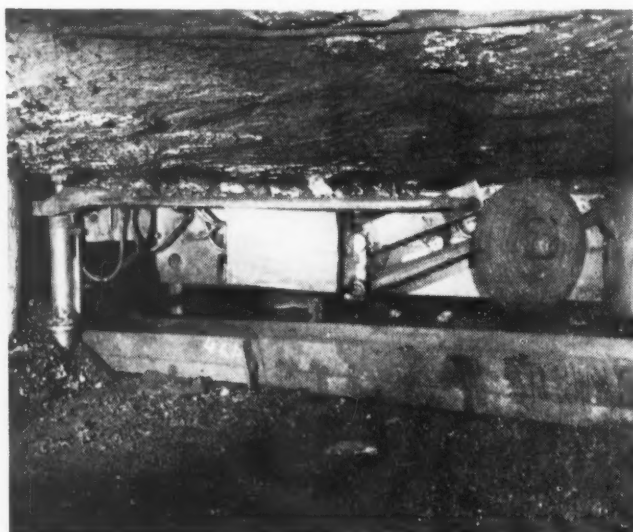
Rubber-Tired Loader Averages up to 23.6 Tons per Man at Ebensburg Coal Co. Mine, Discharging to Chain Conveyors in 36- to 48-in. Seam — 50-Ton Locomotive Designed to Solve 5 1/2-Percent-Grade Bottleneck

IN LINE WITH its long-standing policy of modernization and experimentation to find the most efficient means of mining the 36- to 48-in. Lower Kittanning seam, the Ebensburg Coal Co., Colver, Pa., is one of

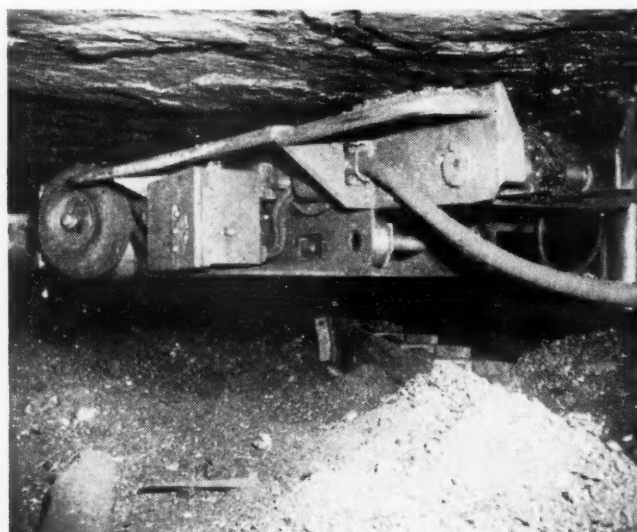
the first mining organizations to put into use the new rubber-tired loading machine developed primarily for loading onto conveyors. In the first three weeks of operation, the machine, loading onto chain

conveyors, mined two 250-ft. rooms. Production per face man averaged 23.6 tons per shift for a period of three days in succession during the trial period. The mine is a 5,000-ton, fully mechanized operation in which a 50-ton locomotive hauls to a 450-t.p.h. tippie and washing plant.

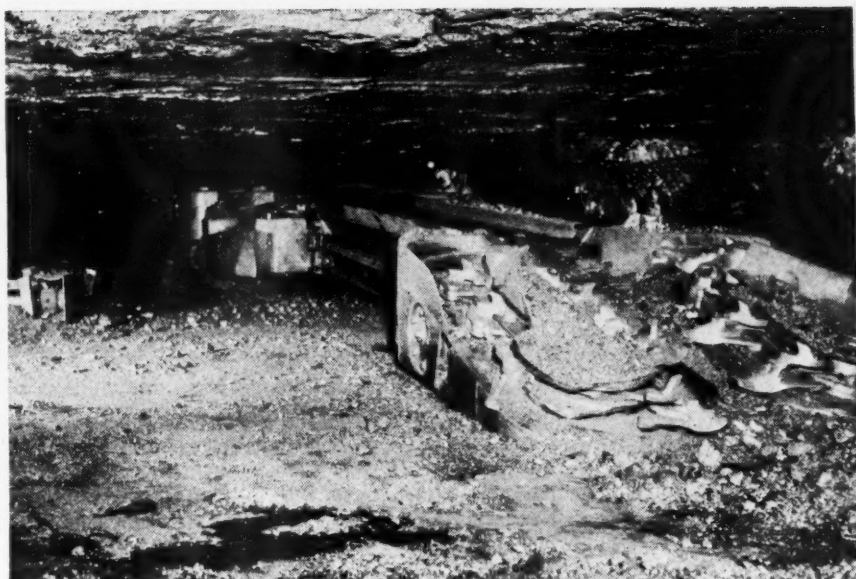
Colver is in Cambria County, seven miles from Ebensburg. The mine, known as Ebensburg No. 1, is a drift operation opened in 1911 and has been a large producer for many years. R. M. Fleming of Col-



REAR VIEW of loader, with hydraulic support and pivot jack left. Rear wheels are retracted in loading.



CHAIN CONVEYOR loaded to capacity. Hydraulic support and pivot jack (right) are behind the conveyor.



IN OPERATION, the loading head is intermittently extended from the body of the machine. Here the head is extended the maximum distance of 12 ft.

ver is general manager; T. L. Aitken, general superintendent; D. J. Sullivan, superintendent; and Walter Angert, mine foreman.

The coal seam, also known as the "Miller" and "B" seam, averages about 42 in. in thickness and, for the most part, has about 4 in. of boney at the top. In some sections the boney is absent. Over much of the mine, the top is a hard fireclay, or slate, which in most places requires only the usual safety posting. Strong rock comprises the top over some sections of the mine. The bottom is a fairly hard fireclay, which, when water is present, does cause some traction trouble for the rubber-tired shuttle cars.

Production equipment at the op-

eration, with the exception of the new loader, includes the following: two Joy 14 BU machines loading into shuttle cars discharging directly onto belts; three Joy 14 BU's into shuttle cars, then to mine cars via an elevator; two 14 BU's into shuttle cars discharging directly to mine cars without elevators; seven 14 BU's to chain conveyors, then to section belts; 12 Goodman G15 shakers with duckbills (non-power type) to section belts. Bottom cutting is done by 17 Goodman 512 shortwalls and top cutting by four Goodman 712 shortwalls.

The mining plan consists of driving 25-ft. rooms 250 ft. deep on 45-ft. centers and taking practically all the 15-ft. pillars on the retreat

from the room. The mine is operated two full shifts, with a limited crew on development on the third shift. The tippie operates two shifts.

That is the general picture into which the new rubber-tired loading machine, the "61 CLM Jeffrey Coal Loader," was injected. The unit, in its initial form, was tried out over two years ago by the Chafin, Jones, Heatherman Coal Co., Logan County, West Virginia. It was first exhibited in its final form at the A. M. C. show at Cleveland, May, 1947.

The machine travels on four rubber-tired wheels, all of which can be swiveled. In operating position, the end of the loading boom extending over the conveyor is supported on a self-contained hydraulic jack engaging the roof and floor, the rear wheels are retracted and the front wheels are swiveled 90 deg. in opposite directions so that the front end of the loader can be swung in an arc. The end of the loading boom is held in practically fixed position over the room conveyor. The rigid neck connecting the loading head and machine has a maximum extension distance of 12 ft.

30-In. Heights Workable

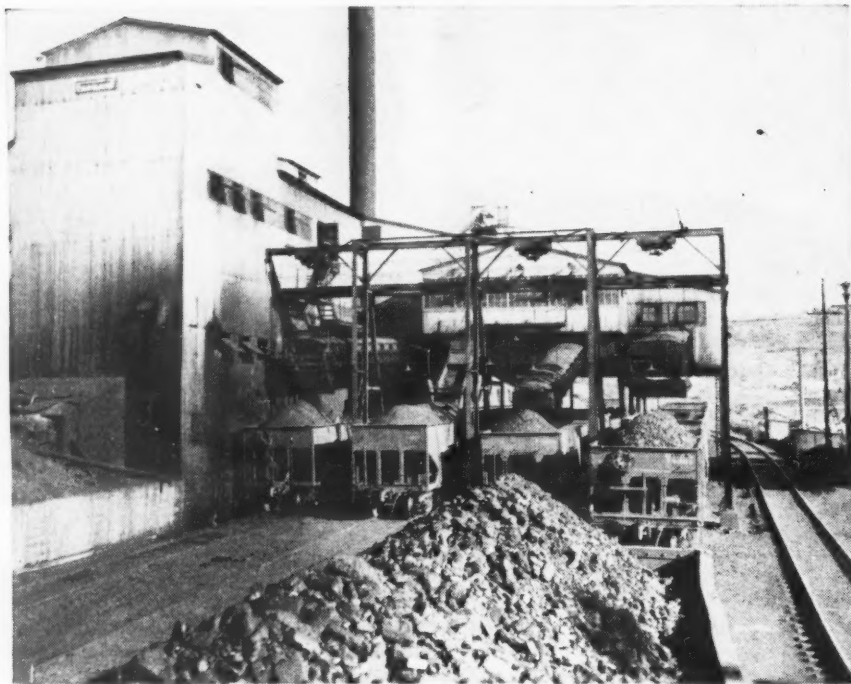
The unit is 24½ in. high and 73 in. wide. Minimum rigid length (with neck retracted) is 24 ft. The machine can load in a 30-in. working height. One 18-hp. electric motor driving an oil pump furnishes the power for all operations. Three hydraulic motors and three hydraulic clutches act as the intermediates. Tires at the front end, which do all the driving for tramping and for the arc loading motion, are 16-ply 7:50x10; the others, 14-ply 6:00x9. Steering for tramping is done with the smaller wheels, which can be swiveled more than 90 deg. each way from normal.

This new loader was put into service at Ebensburg No. 1 on Oct. 7, 1947, discharging to a chain conveyor and mining rooms 26 ft. wide and 250 ft. deep. By Oct. 27, the day on which the accompanying illustrations were made, it had mined two of these rooms. On the morning of the 27th, the machine was put on the experimental work recovering a 15-ft. room pillar and it was on this new job when photographed.

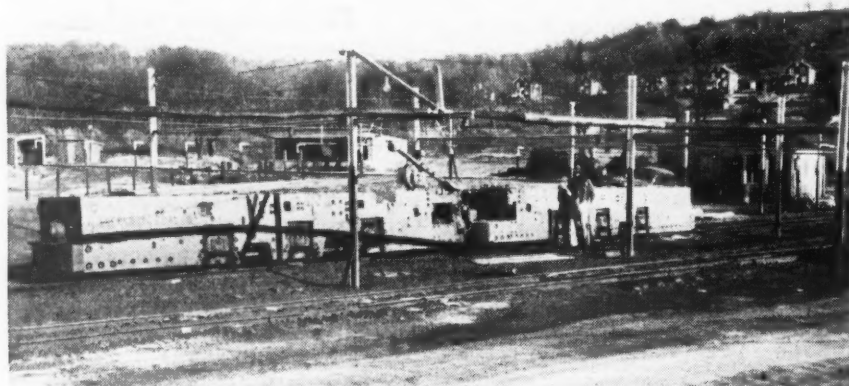
On the advance work, the machine loaded an average of 142 tons per shift for three consecutive working days. A six-man crew was used and the tonnage per man-shift was 23.6. At that time, the ma-



OPERATOR with hands on controls faces the front of the machine, operated by one 18-hp. motor driving an oil pump.



PREPARATION PLANT, which includes a sand cone washer, is rated at 450 t.p.h. The stack serves a mine power plant that burns pulverized coal and is interconnected with the public utility lines.



HAULAGE at Ebensburg No. 1 mine has been modernized by this 50-ton tandem locomotive, specially designed to operate over three miles of $5\frac{1}{2}$ -percent grade against the loads. Track gage of 36 in. was a factor in design.



OPERATING PERSONNEL—Walter Angert (left), mine foreman, Joe Gregg, mechanical foreman, D. J. Sullivan, superintendent, and T. L. Aitken, general superintendent.

chine operator could scarcely have been classed as experienced and no special supervision was provided to try to make a record. In addition to the loading-machine operator and helper, the crew consisted of one cutter, helper, one shotfirer and one "panner-up." The part service of a boom man at the car-loading point was not counted in the crew labor. He also handled the output of a Joy loader working in a room on the opposite side and delivering to another chain conveyor.

Normal rating of the 61 CLM Jeffrey coal loader is $1\frac{1}{2}$ tons per minute, but mine officials were primarily interested in knowing how long it would take to load out a cut. Time studies on the first two rooms, in which cuts produced an average of 28 tons, showed 27 min. as the best time for loading a cut. Many cuts, however, were loaded in less than 30 min.

Other Improvements Effective

About three miles of the $5\frac{1}{2}$ -mile underground haul in the mine is over a $5\frac{1}{2}$ -percent grade against the loads. To solve this production bottleneck, a 50-ton 275-volt locomotive was installed in the latter part of 1945. A careful study of the haulage problem had indicated that a large locomotive would be a better solution than adoption of rope haulage.

This locomotive, made by Goodman, consists of two 25-ton units connected permanently in tandem. Each is of the three-truck type with three 125-hp. motors and the unit thus totals 750 hp. A track gage of only 36 in. was a limiting factor in design.

Telephone service throughout the mine is on a par with that of business offices in any city. Mine phone lines converge to the company's private switchboard in the operating office at Colver and from any telephone in the mine it is possible to make local or toll calls.

A new four-track steel tippie rated at 450 t.p.h. was built in 1939 and a Chance cone washing $\frac{3}{8} \times 5\frac{1}{2}$ -in. coal was added in 1942.

This modern preparation plant, the specially designed 50-ton locomotive, the modern private-line telephone system and full mechanical mining all have been definite steps toward the most modern and efficient operation possible. The installation of this latest type low-seam loading machine is still another.

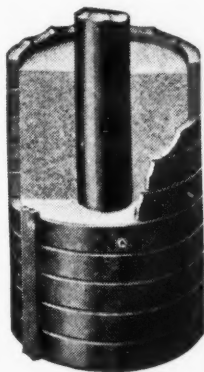
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3. **RUGGEDNESS** . . . to withstand hard usage.
4. **LONG LIFE and MINIMUM MAINTENANCE** . . . which add up to better service at a saving.

Because of these outstanding qualities, Exide-Ironclad Batteries are used by more mine operators than all other batteries combined.

Most batteries look much alike on the surface. But inside are the differences that determine power, performance and battery life. One notable difference in Exide-Ironclad construction is the positive plate.



THE POSITIVE PLATE

consists of a series of slotted tubes which contain the active material (see small illustration at left). So fine are these slots that, while permitting easy access of electrolyte, they retard active material from readily washing out . . . thus assuring years of safe, dependable, day in and day out mine haulage service.

If you have a special battery problem, or wish more detailed information, write for booklet Form 1982.

THE ELECTRIC STORAGE BATTERY COMPANY
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The Foremen's Forum

Human Safety Gadget; Rule Enforcement

"Where can I find a guy who can figure out a safety gadget to be attached to humans?" Lifeboats on a ship may never be used. But if they are needed, no one considers their cost wasted.

Safety rules may seem like a burden but if they are followed in a reasonable manner will save injuries. The man who does, and also thinks, is likely to be a jump ahead of the man who simply does. The real danger factor in the majority of accidents is the human factor—the "devil-may-care" actions of some of us, the "let-George-do-it" attitude of others, the little careless acts that result from having our minds on something else.

Every person has some responsibility for preventing accidents. He can discover in himself the unsafe actions and attitudes that have become habits, probably without his knowing it. Then, he can change those habits, beginning today. "Doing what comes naturally" does not always mean the safest method. Most of us are somewhat inclined to be thoughtless by nature. We don't always do the safe thing, even when other people tell us what to do. Therefore, to be safe, each person must set safety standards for himself—and then be his own policeman to hold himself to them.

"Why is impartial enforcement of rules by the supervisor essential?" If rules are not reasonably and uniformly enforced, they can become ineffective. Any worker who sees someone else disobeying the rules has a feeling that he also should be privileged to disobey rules. If a rule is a good one, it is good for everyone.

A desire to learn should be part of every man's attitude toward his job. None of us respects a "know-it-all" attitude in another person. It shows at once that the other person is out of step or standing still. Let's face the fact that during the war period discipline slipped. But let's also admit that most of us prefer to work where conduct is regulated reasonably and fairly. Only when proper standards are maintained can each person give his best and get the full benefit from his job.

Without a definite plan, the efforts of an individual worker do not gear into the efforts of another. Time and energy are wasted and little satis-

faction is derived from the job. Who can say what is "minor" at the time it happens. A match is a "minor" fire but it can do a lot of damage. Prompt reporting of a small injury may prevent a serious infection.

Pittsburgh Coal Co. *P.C.C. News*

The Big Question

By C. P. FERGUSON

Safety Director
Red Jacket Coal Corp.
Red Jacket, W. Va.

The most important thing about any accident is, simply, this: someone gets hurt, someone suffers.

We talk about accidents at this mine or that mine—of so many fatalities; of the loss of an arm, leg or fingers; of broken bones and cuts and bruises. But, somehow, that doesn't mean us—statistics are never personal. No, it's no use remembering the statistics. The thing to remember is simply this: the next accident may happen to you, the pain and suffering may be yours, and it may stay with you and cause endless suffering to you and your family.

Your life, your arms and legs, your precious eyes—the only ones you will ever have—may be written down on an accident report. But accidents

needn't happen to you. The real thing is that practically all accidents can be prevented.

Let's think this over. See that you and your family do not suffer from a needless accident. If all of us will do our best, we will soon be convinced that safety pays.

[The preceding statement of the approach supervisors can use in talking safety to employees is reprinted from a recent issue of *The Red Jacketeer*.]

The Good Boss

You will know the good boss by the pleasant atmosphere throughout his office, his division or his section. He gives credit ungrudgingly, frankly, and openly where credit is due. He inspires his employees with his own enthusiasm. Anyone under him can come with a problem, business or personal, with a feeling that he will be encouraged or helped. He knows how to give out the work fairly and how to value it when completed. He does not drive his people; he leads them. He knows the job thoroughly and the ability of his workers. He is alive to new methods and is eager to try out those presented by others. He makes careful progress reports on employees. He keeps nothing secret that, within the limits of company policy, he can reveal to stimulate



MINE LUBRICANTS

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VEPRESSA



SWING GEARS NEED THE LUBRICANT THAT'S TOUGH ENOUGH TO SWING THE JOB...VEPRESSA

Tremendous pressures, quick reversals, sudden shock—it takes a mighty tough lubricant to “swing” that job in the swing gear of your big strip shovel. And Vepressa is *more* than equal to it. Marathon Vepressa is compounded for extra high adhesive qualities and film

strength plus stability and lubricating performance. Non-corrosive to any type of metal or bearing. Inhibits against sludge and oxidation. Vepressa's efficiency is not reduced by moisture from condensation in gear cases—it will not separate in storage or in service.

An Ohio Oil Company mine lubrication engineer will be glad to show you the advantages of Marathon mine lubricants. He will explain the practical operating benefits of Vepressa for swing gears, lubricated eccentrics, high-speed anti-friction or plain bearings and all enclosed reduction gears. Just write, wire or phone.



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interest. He trains conscientiously, promoting as soon as he can. He upgrades with pleasure and demotes with sorrow. He is genial and friendly, but at all times conscious that the command and responsibility are his. He keeps himself free of routine that he may cope promptly with the unexpected.

There are such bosses. Yes, I know many such and I admire them tremendously.

—W. Va. Coal & Coke Safety News

How Good Orders Pay Off

Any one of several reasons, or a combinations of reasons, may be the cause of poor work by miners. Bad working conditions, lax discipline, low morale, a general don't-care attitude, frequent breakdown of machinery and repeated power outages are some of the commonest reasons for slowdowns and shoddy work. A good foreman spots these causes and takes quick corrective steps.

However, another cause of poor work—vague, incomplete orders and instructions—often is overlooked and, even when spotted, sometimes is neglected because it is easier for the foreman to blame someone else than to correct his own weakness. In this situation, without remedial action, things quickly go from bad to worse. Not knowing what is expected of them, how to do the job right or why the job needs doing at all, workers soon drift into careless habits and leave their work half done, with the result that time is lost, morale sags, low ratings mar the crew's record and resentment grows against the foreman.

Orders that are simple, positive and effective grow out of thorough preparation, skill in speaking, clearness in thinking, knowledge of human relations and firmness of purpose. The best procedure is as follows:

1. The foreman must look over the job himself, prior to giving orders, to determine just what has to be done, how it can be done most efficiently, how long it will take and how many men will be needed.
2. He must tell his men in detail what the job is and what it will accomplish.
3. He must explain in detail how to do the job.
4. He must divide the work specifically as to duties, fixing each man's responsibility.
5. He must name a time for completion of the job.
6. He must tell his men why the job has to be done.
7. He must maintain an attitude of man-to-man decency, firm but not commanding, pleasant but not familiar.

Clear orders, laid out on this pattern, go a long way toward assuring

a clean job, finished on time. This, in turn, means a good production record for the crew, a better rating for the foreman, teamwork among the workers and respect for the foreman.

Bawling Out Workers Publicly Sometimes Right

Is it ever right for a foreman to call a worker's hand in public? All the rule books say it shouldn't be done, and generally they're right. But sometimes it's the only treatment that does any good.

Just for example, take an imaginary case that almost any foreman might find himself in the middle of. He doesn't bawl out his "wise guys" when others are working close by. He doesn't needle his slackers in the presence of the crew. He doesn't reprimand unsafe workers in public. Instead, he calls the offenders off to themselves, says "Please," acts pleasantly and in general handles his men with kid gloves. This is good, most of the time, and most of the men appreciate this kind of treatment.

But, if there are a couple of soreheads or smart guys in the crowd, things may get out of hand. The offenders take advantage of the quiet, friendly manner of their foreman and conclude that he's a soft touch and a Weak Willie. They get the idea that anything goes. Then, first thing the foreman knows, they're ignoring the rules and laughing at him behind his back. Next, they openly dare him to do anything about it. Before long, the rest of the crew, though they were good workers before, get infected with the same ideas, with the result that lives are endangered and production falls off.

Of course, the foreman is partly to blame for the fix he is in now. While he has let things slip, the good men have enjoyed seeing the ringleaders put something over on the boss; they've lost their respect for him and they're about ready to join the wise guys in ridicule and open defiance.

If the foreman has let things rock along until he's got himself into a box like this, there's only one thing he can do—first get the facts, then put the finger on the ringleaders and let 'em have it in the presence of the whole crew.

This is bad medicine and must be used only when the foreman has been backed up against the wall by open defiance of authority and rules. It won't repair the damage 100 percent. But it will show the ringleaders, together with the rest of the crew, that the tide has turned and that from now on out the foreman means business, strictly business. Once this public reprimand is made, a firmer hand in private and a more alert watch for

discipline breakdown will keep another out-of-hand situation from developing.

Yardstick for Discipline

A loud voice, a quick temper, speed in getting around the mine, ability to spot things to criticize—these are not the true measure of a foreman's skill in discipline. The front office measures his effectiveness in the same way as it measures the value of a machine—by results. The high-brass yardstick for good discipline is high tonnage, full mine cars, low absenteeism, a minimum of equipment breakdowns, few grievances and a good safety showing. The foreman has to stand or fall on his record in these six columns.

How can the foreman be sure his six-column front-office record will add up in his favor at the end of the month? The best way is to keep a running check on himself every day. He is in a good spot to do this because he works closer to his men than top management and he sees them every day. Thus, having a better opportunity to measure more things, the foreman can spot symptoms of a breakdown in discipline and apply the remedy before bad results show up in the permanent monthly record.

If he makes the best of his daily chance to observe and analyze the effect of his discipline, he will have much more than the six-column front-office yardstick to measure himself by. This will lead, in turn, to better control of the situation, quicker diagnosis of trouble and surer application of treatment where it is most needed.

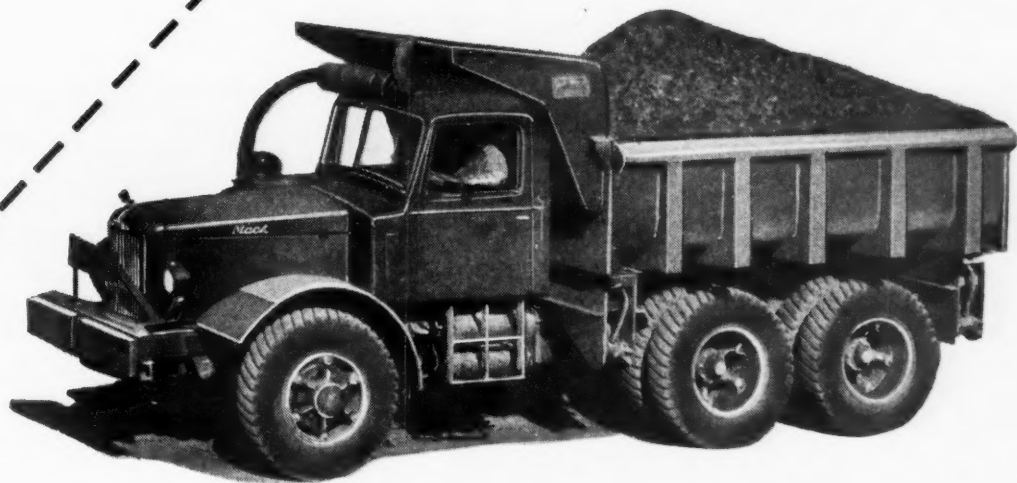
The foreman's checklist naturally will lead off with the front-office columns, as follows:

1. High tonnage.
2. Full mine cars.
3. Low absenteeism.
4. No breakdowns.
5. No grievances.
6. No accidents.

To these columns, the foreman who wants to keep check on himself and his discipline will add columns of his own, somewhat as follows, filling them in from day to day with what he sees among his men on the job:

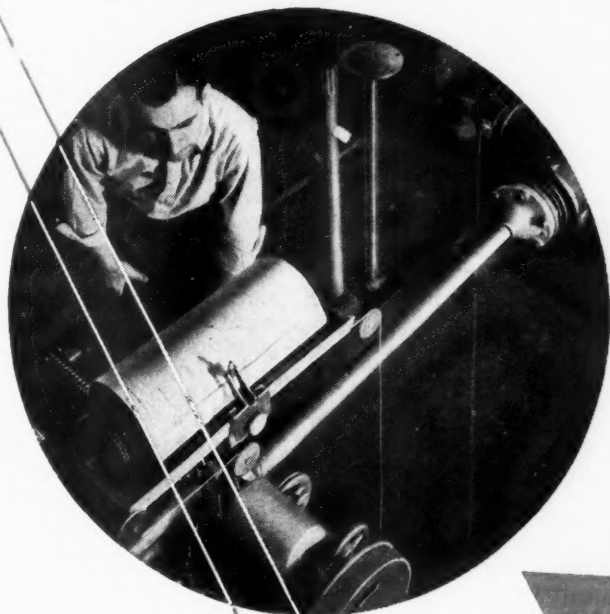
7. On-time reporting for work.
8. No "soldiering" on the job.
9. Teamwork among his men.
10. A full day's work by every man.
11. Quick obedience to reasonable orders.
12. A minimum of "beefing" and grumbling.
13. Obedience to company rules.
14. Few requests for transfer to another job.
15. Pride in the job.
16. Pride in the company.
17. Willingness to ask questions.
18. No bypassing of the foreman.

you get more work out of Mack Trucks



There's good reason why you find so many hard-working Mack dump trucks engaged in coal stripping operations. Profit-wise mining men know that the true measure of a truck is the way it pays off—in work. They know, too, that when it comes to working harder and lasting longer... at lowest cost, there's nothing on wheels to beat a Mack.

because...we put more work into Macks



There is no guesswork about the stamina of Mack parts. This testing machine determines the strength and elasticity of Mack axle shafts by imposing measured torque up to point of fracture. Sample shafts are tested to destruction, thus insuring that all Mack shafts fully measure up to Mack's exacting standards.



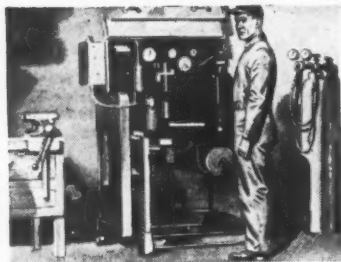
Mack

trucks for every purpose

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

6218J

SINCE 1900, AMERICA'S HARDEST-WORKING TRUCK



Operating Ideas

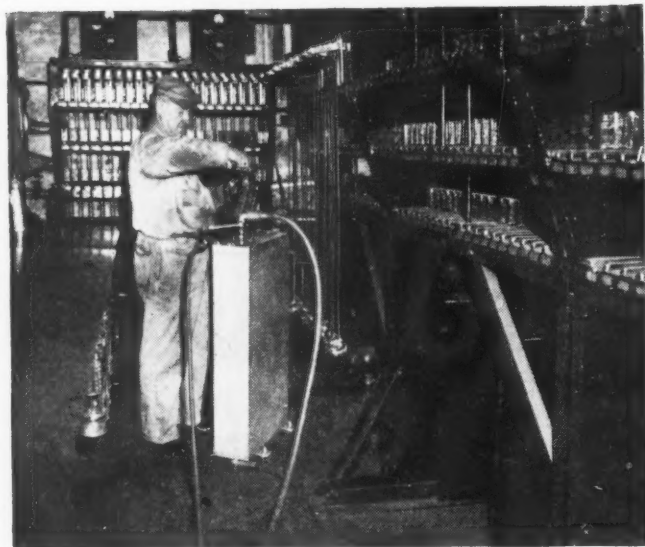


FIG. 1—BATTERY WASHER on casters can be moved by Mr. French, designer of the machine, to any convenient place in the lamp house.

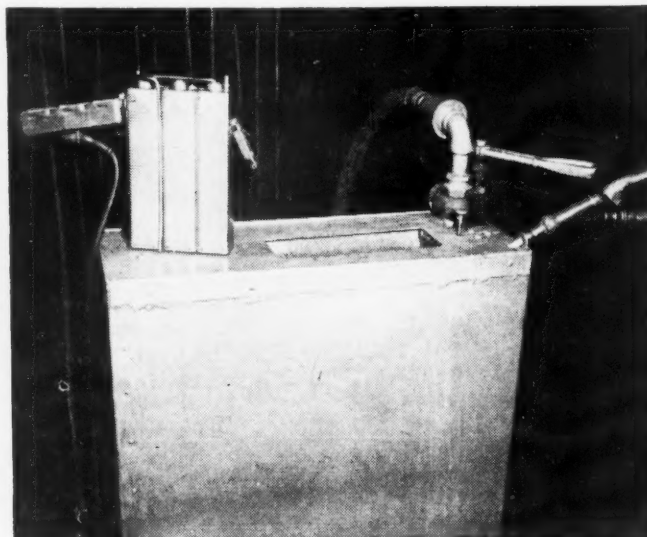


FIG. 2—CAP-LAMP BATTERY, with valve lock in place, is ready for lowering into the washer. Water and air valves are seen at right.

Lamp-Battery Washer Cuts Time and Maintenance

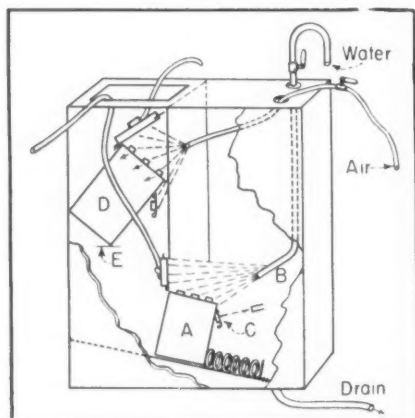


FIG. 3—WATER SPRAYS wash batteries clean in position "A," air jets dry them in position "D."

ALKALINE STORAGE BATTERIES for M. S. A. Model P cap lamps at mines of the Lake Superior Coal Co., at Superior, McDowell County, W. Va., are washed with one-fourth the labor formerly required and receive a much better and more regular cleaning than previously with the portable washing machine designed and built by R. B. French, lamp man at those mines. Now, with the new machine, washing is no longer a messy job. In addition, lamps are giving better service and no traces of solution are left

to get on miners' hands and clothes.

The lamp washer, as shown in Fig. 1, can be moved on its casters to any convenient position alongside the several lamp racks. Air, water and exhaust hoses are long enough to permit free movement. When not in use, the hoses are disconnected and the equipment is stored out of the way.

Before a lamp is lowered into the washer, a valve holder is snapped over the top to close the valves and prevent water from entering through the vents. This holder (Fig. 2), also designed by Mr. French, is made of a short length of 3/16-in. stiff wire, bent to proper shape to contact the valves and to reach down and latch under the bottom of the case. This holder is useful also in testing for valve leaks, a leak being quickly detected when, with the valve holder in place, the battery is turned upside down with its cover open.

Fig. 3 shows how a lamp is washed. With the top open, the lamp is lowered to position "A," its slide being cushioned by a coil spring. From slots in the side of the horizontal pipe "B," three sheets of water hit the top of the battery and the inside of the open cover. One strikes along the center on the valves and the other two hit close to the edges of the top. Other sprays strike the lock and staple at "C," thoroughly cleaning them.

Next, the battery is lifted up and a pull rod is moved so as to bring stop "E" into position. This holds the battery at position "D." An air valve then is turned on and nine air jets strike the top, the inside of the cover and the hole of the magnetic latch. When pulled out of the washer, the battery is free of trapped water and practically dry on the outside, advantages that prevent electrical leakage and enable batteries to be returned to the racks immediately.

Air for the battery washer is supplied through a 1/4-in. hose, water through a 1/2-in. hose. A 1 1/4-in. drain hose extends from the bottom of the washing tank to a discharge point on the ground near the end of the building.

One lamp house serves both No. 3 and No. 4 mines of the Lake Superior Coal Co. Of the 512 lamps in stock, 75 were bought in 1941 and 300 more in 1942. To date, it has not been necessary to renew a single cell or plate. Since the washer was put into use on May 31, 1943, all lamps have been washed once a month. On a Sunday or holiday, Mr. French washes all the lamps between 6 a. m. and noon, whereas it formerly was an all-day job for him and a helper. In addition, there is no hand brushing or rinsing and the job is more thoroughly done.

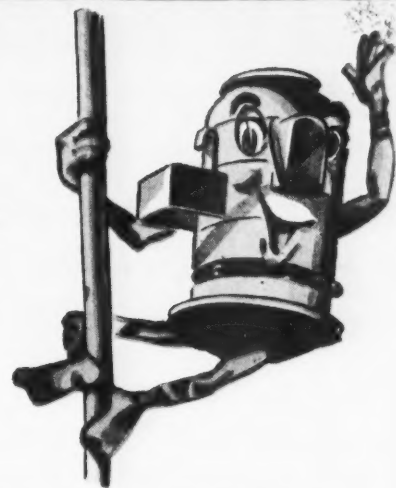
"Which Squirrel-Cage Motor Shall I Buy?"



Open-Type? This general-purpose squirrel-cage motor meets about 9 out of every 10 application requirements; so chances are it's the design you'll select. Allis-Chalmers builds generously proportioned, rugged *open-type* squirrel-cage motors in sizes from 1 hp to the largest practical requirement.



Splash-Proof? Where operating conditions are conducive to entrance of particles or liquids into ordinary motors from either top or sides, Allis-Chalmers *splash-proof* squirrel-cage motors may be your best buy. They're designed to *exclude* top or side directed particles and liquids. Sizes 1 hp to the largest.



Vertical? or Flange-Type? *Either* can solve a space problem. *Vertical* motors (sizes 1 hp to largest) for vertical drives. *Flange-mounted* for side or angle drives. In both types bearings and closures are designed to prevent grease escapement. Mounting flange for attaching to your base can be provided.



Totally-Enclosed? Explosion-Proof? Completely weather-proof and fan-cooled, these motors are built to beat abrasive dust, dirt and corrosive fumes, or moisture conditions that cause windings in ordinary motors to deteriorate. *Explosion-proof* type for oil refineries, paint, varnish or lacquer plants, etc.; Underwriters approved; reduce hazards in explosive or dust atmospheres. Either type built from 1 hp and up.

Are Motor Decisions More Important Today?

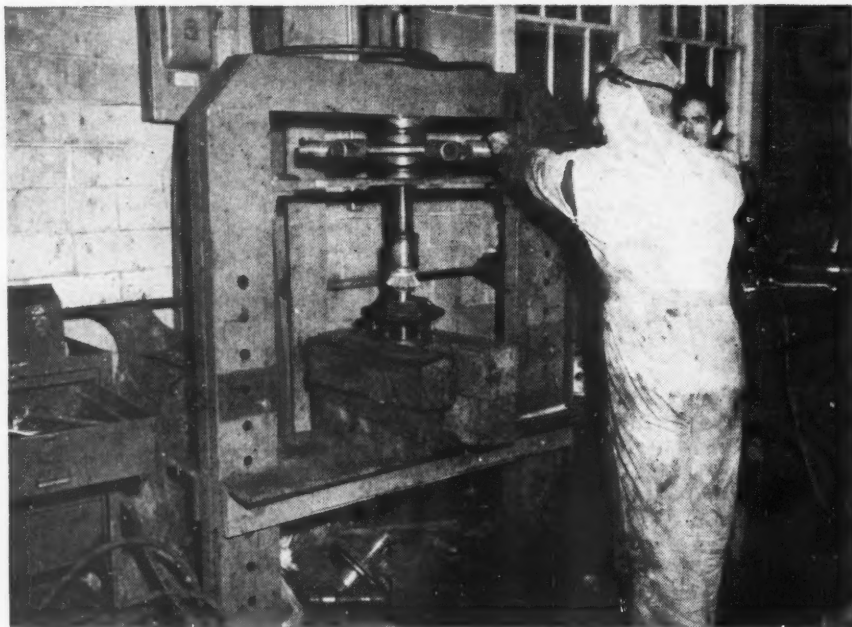
YOU BET THEY ARE! One *obvious* reason is the need for keeping costs down. Another is that in the rush to fill demand much equipment is being misapplied; making it harder to maintain profits not alone today, but tomorrow, the next day and the next year—as long as misapplication continues!

That's why it's important to take a good look at motors—their characteristics—your equipment—power source and surroundings—*before* you buy and apply! If you're in doubt, don't take chances—call a motor expert! **ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2327**



ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment-
Biggest of All in Range of Industrial Products



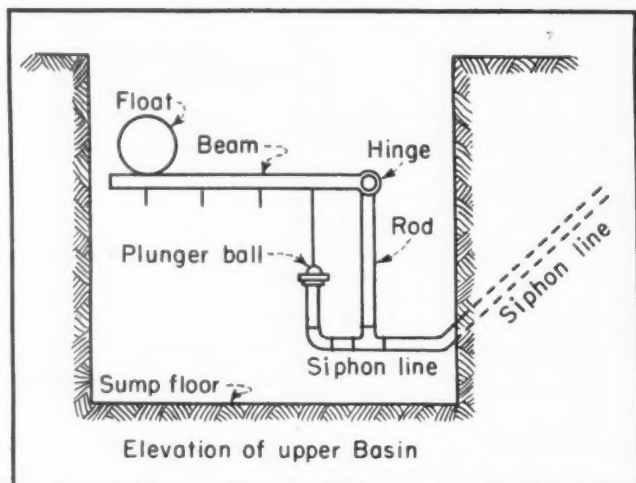
MACHINE is used to press a pinion into the speed reducer of a shuttle-car motor.

Shop-Built Press Handles All Jobs

A VERTICAL SCREW PRESS pictured in the accompanying photograph was built in the new maintenance shop at Crichton No. 4 mine, Johnstown Coal & Coke Co., Nettie, W. Va., and handles all pressing jobs at this trackless operation. The 2 $\frac{3}{4}$ -in. screw has four threads per inch. A 12-in. leverage or radius extends from the screw center to the ends of the sockets in the wheel. The wheel, which is welded to the nut, has six sockets with 1 $\frac{1}{2}$ -in. holes. On a heavy job, two men with 3-ft. bars turn it.

Travel of the screw is 12 in. Width between bars is 4 ft. and vertical capacity is the same. Since Crichton No. 4 mine is a conveyor operation and has no locomotives, this press is never called on for pressing locomotive wheels, which would be beyond its capacity.

Automatic Siphon Valve Needs No Priming



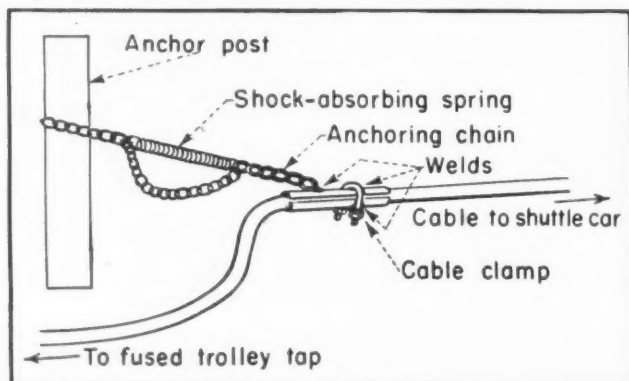
SKETCH of upper siphon basin and use of siphon valve.

REPRIMING A SIPHON LINE, or at least that part affected when the upper basin becomes empty, can now be a thing of the past, writes E. A. Smith, civil and mining engineer, Glogora Coal Co., Glo, Ky. The effort and expense of running back and forth from summit to basin, to close and open valves in connection with the operation, can be eliminated with a new automatic siphon valve design offered by Mr. Smith.

As shown in the accompanying illustration, the plunger ball, seated within the upper end of the siphon line for the stop, is placed so that it is lifted automatically from contact with the siphon line when water rises within the sump or basin. Thus, the water is permitted to enter the siphon line for discharge at the lower basin. The float, attached to a beam on a hinge, can be made to lift the ball as the water rises within the sump. As the water lowers within the sump, the valve is proportionally closed. Thus, the water is handled automatically in accordance with inflow.

The automatic siphon valve is not manufactured commercially but it can be made easily at the mine shop if the engineer furnishes plans and figures, says Mr. Smith.

Spring Absorbs Shocks From Cable-Reel Motor



A SPRING ANCHOR for the cable of a cable-reel shuttle car permits the shock to be taken up when the shuttle-car reel motor is accelerated to pick up the cable, writes James T. Sauls, Powellton Coal Co., Mallory, W. Va. The cable clamp, shown with other parts in the accompanying illustration, is made of a length of $\frac{1}{2}$ -in. pipe, split into two sections and clamped on the cable with a rope clamp. The anchoring chain is welded to the clamp, which is long enough to distribute the grip on the cable over considerable surface.

SPRING attached to anchor chain absorbs shock on the cable when the reel motor is speeded up.

ADJUSTABLE FOR
SIZED PRODUCTS

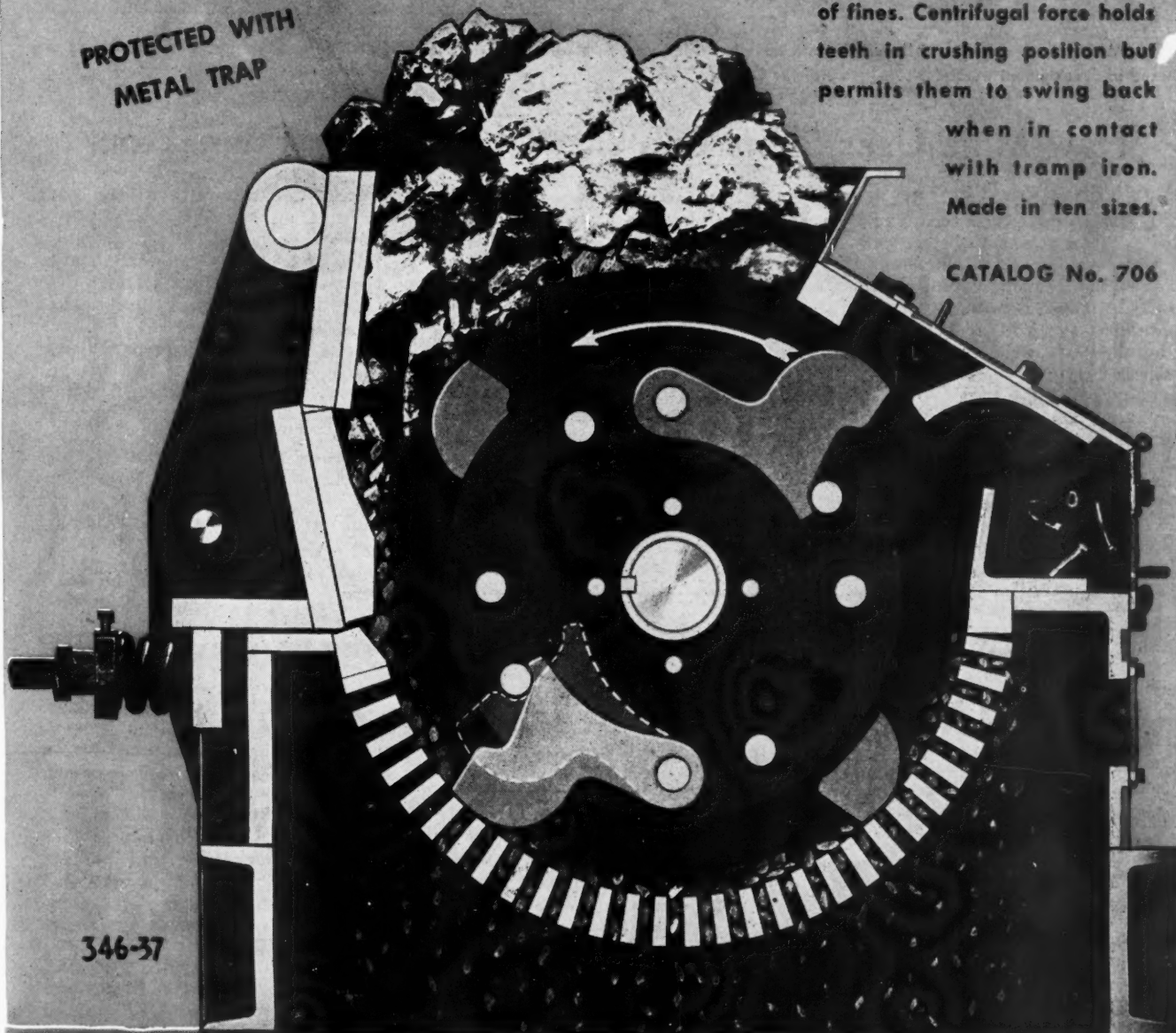
FLEXTooth (PATENTED) CRUSHER

FROM 2" TO 1/4" MINUS

PROTECTED WITH
METAL TRAP

Reduces run-of-mine coal to either a high or low percentage of fines. Centrifugal force holds teeth in crushing position but permits them to swing back when in contact with tramp iron. Made in ten sizes.

CATALOG No. 706



346-37

THE JEFFREY

MANUFACTURING COMPANY

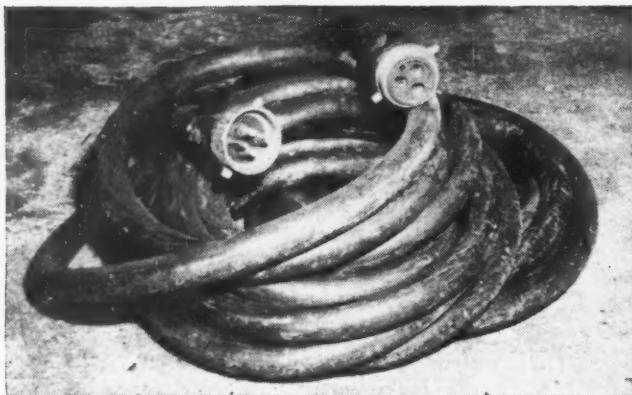
912-99 North Fourth St., Columbus 16, Ohio

ESTABLISHED 1877

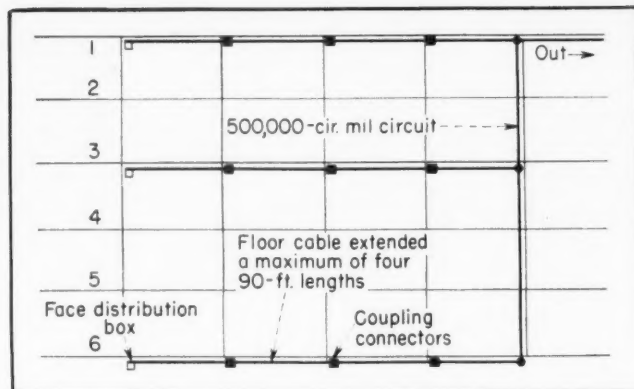
Complete Line of
Material Handling,
Processing and
Mining Equipment



Baltimore 1	Buffalo 2	Cleveland 13	Hartford	Jacksonville	Pittsburgh 22
Birmingham 3	Chicago 1	Denver 2	Houston 5	Milwaukee 11	St. Louis 3
Boston 14	Cincinnati 2	Detroit 12	Memphis 10	New York 7	Salt Lake City 1
				Philadelphia 2	Savannah 2



THREE-WIRE No. 0 cable in 90-ft. lengths with coupling connectors is used in development work at No. 11 mine of the Delmont Fuel Co.



MAIN-ENTRY PROJECTION is indicated by light lines and power circuit by heavy lines.

New Mine Uses Short Cables With Coupling Connectors

THREE-CONDUCTOR CABLES made up at the factory in 90-ft. lengths with coupling-type connectors vulcanized on have proved to be convenient, safe and economical in the development mining underway at the new No. 11 mine of the Delmont Fuel Co., Summersville, W. Va. These cables are used in conjunction with face distribution boxes containing overload circuit breakers.

As shown in the accompanying drawing, a six-heading main is being driven. Joy loaders deliver to chain conveyors extending a maximum of 320 ft. to a mother chain conveyor, which in turn delivers to a belt on No. 1 heading. The latter is a part of a belt system extending all the way to the tippie. Headings are on 65-ft. centers, crosscuts are opposite each other and on 80-ft. centers and all places are driven 20 ft. wide. Voltage is 275 d.c. and the Peerless seam being mined is nongassy.

Just before the cross conveyor is moved up four cross-

cuts and the belt extended 320 ft., twelve of the 90-ft. sections of floor cable are in use.

The No. 0 three-conductor cables were sent from the cable factory to the Mines Equipment Co. for application of the coupling-type connectors, which are polarized by dowel pins. Couplings are fitted with pins for handling with spanner wrenches as used on fire-hose couplings. One of the three conductors serves as a separate and solid ground to the frames of the cutters and loaders. Each floor cable serves two entries or rooms. The face distribution boxes containing overload circuit breakers were furnished by the Mines Equipment Co.

Earlier delivery date was a factor in choosing cables with the grounding wire the same size as the power conductors.

Okey Johnson is general mine foreman and L. W. Leedy is chief electrician at No. 11 mine.

Tall Chimney and Hood Confines Forge Fumes



TWO HOODED FORGES served by a divided chimney cause no smoke or fumes in this shop.

A MAINTENANCE SHOP with a begrimed, sooty interior and smoky atmosphere obviously is quite out of step with present-day mining efficiency. Yet in most shops a coal-fired forge is still a necessity and the problem of confining and carrying away the smoke and fumes must be met. Because of the fumes, the blacksmith shop is usually

in a separate room or building. That the forge can be placed right in the main shop, not separated by a partition, and yet not dirty the shop has been proved by an unusual installation at Mine No. 38, Barnesville shaft, Consolidation Coal Co. (W.Va.), near Fairmont. The shop walls and ceiling were painted white in May, 1946, and still are fairly clean. Acetylene and electric welding have been responsible for the slight darkening that has occurred.

A 30-ft. brick chimney of generous inside dimensions, together with a hood that has one side opening to the chimney and one side closed, are responsible for the clean performance of this forge. The unit, designed by Russell W. Morris, maintenance foreman, includes two forges and one chimney divided for a distance of 15 ft. above the forges. The 30-ft. height of the chimney provides ample natural draft and places the chimney top several feet above the ridge of the roof, thus preventing high winds from causing a downdraft.

Production Bottlenecks

It often takes a real idea to lick a tricky bottleneck—an idea that you can justly be proud of. So why not get the credit for it? Send us your operating, mechanical, electrical or safety ideas for publication. If acceptable, *Coal Age*, on publication, will pay you \$5 or more for each.

"NITRAMEX"

*the New
Du Pont Blasting Agent
Provides More Energy
for Tough,
Bottom-Shooting*

"NITRAMEX"* is used in combination with Du Pont "Nitramon"† blasting agent primarily to increase energy at the bottom of well drill holes in quarries, hard-rock strippings, and open pit ore mines. The blasting performance of this new product matches that of 75% gelatin . . . yet it is safer and far more economical to use.

By concentrating energy where it is needed in tough-shooting formations, "Nitramex" frequently permits wider spacing of drill holes, thus reducing drilling costs.

"Nitramex" is conveniently packed in water-resistant containers and, like "Nitramon," it can be safely loaded far ahead of firing time. It is both easy and safe to handle . . . and use.

Ask your Du Pont Explosives representative for complete information about this new and worthy companion product to "Nitramon."

E. I. DU PONT DE NEMOURS & CO. (INC.)
Explosives Department, Wilmington 98, Delaware

*Trade-mark for a Du Pont ammonium nitrate blasting agent.
†Reg. Trade-mark for nitrocarbonitrile blasting agent.



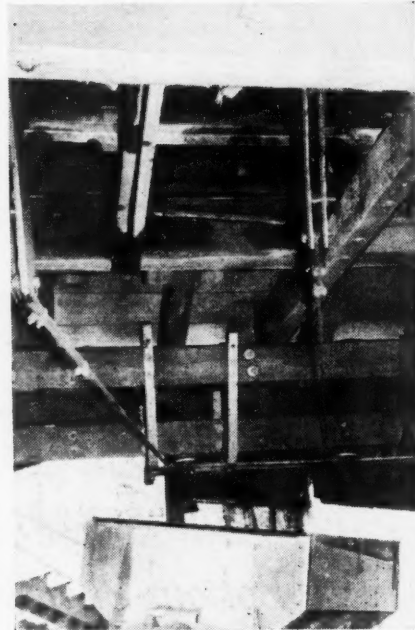
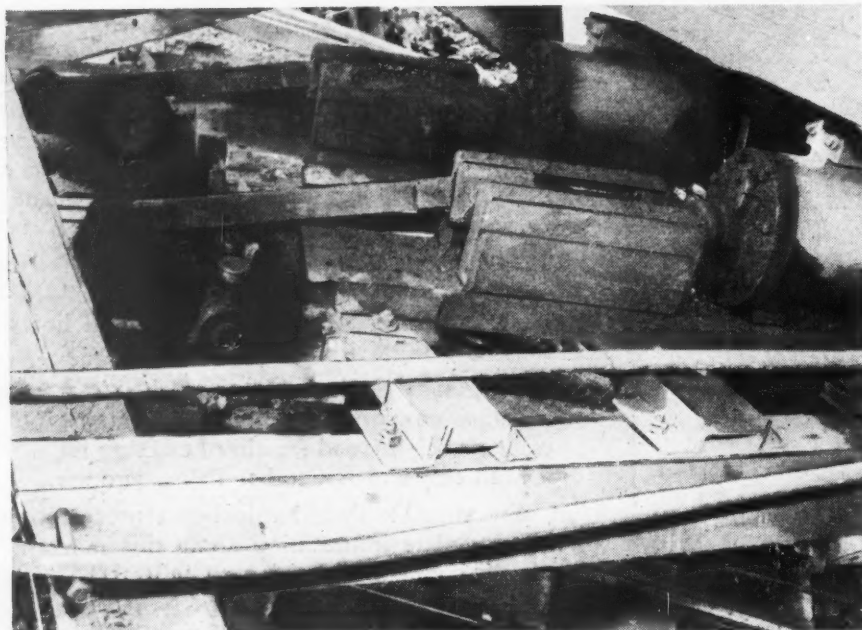
Loading a charge of "Nitramex" in bottom of 45-foot drill hole in open pit mining operation. "Nitramon" is loaded in top section and the charge is fired with "Nitramon" Primer.

DU PONT "NITRAMEX"

A NEW PRODUCT OF
DU PONT EXPLOSIVES RESEARCH

BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY





LEFT—TWO AIR cylinders provide power for opening and closing storage-bin gates at the headhouse. Right—Coal flows into a waiting cable car on the left-hand track. Right-hand gate stays closed meanwhile.

Air-Powered Gates Facilitate Loading at Headhouse

PNEUMATIC GATES, built on the site at nominal cost, dump coal from the headhouse storage bin into waiting cable cars for the trip down the incline at the Eagan mine of the Blue Diamond Coal Co., Eagan, Tenn. Two second-hand air cylinders, a system of driving rods, 1½-in. pipes for air-pressure charge and exhaust, a control valve and a compressor driven by a 15-hp. 440-volt General Electric

motor make up the installation. The compressor provides air pressure at 100 lbs.

The two cylinders, viewed from above in the accompanying illustration, control respectively the left- and right-hand gates, depending upon which of the two tracks the waiting cable car is standing on. The other photograph, taken from below the installation, shows a car being loaded

through the left-hand gate, which has been opened by the system of driving rods, cables and sheaves visible on the underside of the headhouse framework.

With an air valve at his side, the drum operator in the drumhouse, about 150 ft. higher up the incline, controls the gates. To help the operator, an automatic signal light flashes on when a car is properly spotted.

Double U-Type Pins Support Crossbars



WEDGES between the end of the rail and the rib prevent spalling.

SAFER OPERATION, lower timbering cost and better clean-up by the loading machine with less hand labor are the principal advantages of the pin method of supporting temporary

crossbars at the face in medium to thick seams. With a number of mines now using pin timbering at the face, several variations have been devised, some of which have been previously

described in *Coal Age* (December 1946, p. 140; January 1947, p. 64; and December 1947, p. 104). Still another is shown in principle in the accompanying illustration made recently in Ebensburg No. 1 mine of the Ebensburg Coal Co., Colver, Pa., where the method has been in use over five years for supporting permanent crossbars where top is taken for haulage.

This use of a double pin calls for drilling two holes for each end of the bar. The bent-down loop provides a socket out of which the end of the bar cannot slip. Although this particular photograph shows a permanent crossbar supported by a double pin in shale instead of coal, it serves to illustrate its possible use in a coal rib where temporary timbering is needed for roof support.

This pin is made from 1¼-in. stock and the crossbar is a 70-lb. rail 18 ft. long. Wooden wedges between the end of the rail and the rib prevent spalling.

Destination:



Wet Locations

Ready to roll on the first leg of a long journey is another shipment of Simplex-ANHYDREX Cable. Destination? Davey Jones' Locker, for that reel contains 4,000 feet of water-resistant ANHYDREX Non-leaded Submarine Cable.

Sure, it's a big cable and it's especially designed to meet conditions you may not run up against in your field, but here's a fact worth remembering:

Simplex-ANHYDREX cables are made in sizes and types adaptable to every application in locations that are wet and damp. All are constructed with the same low-water absorption ANHYDREX insulation. Test after test and performances in the field have proved that during years of

constant immersion, ANHYDREX has greater stability in water than any other rubber insulation.

Think what this means to you! Added years of performance per cable. Fewer service interruptions; steadier production. Lower maintenance costs and less-frequent replacements.

ANHYDREX-insulated cables are available for use underground, overhead and in ducts. To meet the needs of the mining industry the ANHYDREX line includes Bore Hole, Shaft, and Feeder Cables, Mine Telephone Cables and cables for track signals and relay controls.

SIMPLEX-ANHYDREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.



Multiple Endorsement

...FROM MANUFACTURERS OF POWERED EQUIPMENT

The strongest possible testimonial to the proved performance of Cummins Dependable Diesels is the number of Manufacturers who offer Cummins Diesels as standard or optional power in the equipment they build. These Manufacturers recognize customer demand for dependable, economical, smooth-running engines . . . advantages provided by Cummins Diesels in applications requiring up to 275 hp. Ask your Cummins Dealer for a complete list of the Manufacturers offering Cummins Diesel Power.

CUMMINS ENGINE COMPANY, INC.
COLUMBUS, INDIANA

- 39 material-handling and earth-moving equipment Manufacturers . . .
- 8 diesel-electric locomotive Manufacturers.
- 25 heavy-duty truck Manufacturers . . .
- 19 oil field equipment Manufacturers . . .
- 10 logging equipment Manufacturers . . .
- 101 Manufacturers of Powered Equipment offer Cummins Dependable Diesels as standard or optional power. Cummins Diesels also have wide acceptance in portable and stationary industrial power applications and marine service.

News Round-Up



Anthracite Group Begins Large-Scale Advertising

A large-scale advertising and promotion campaign to inform the 5,000,000 anthracite users in the northeastern part of the country of the availability and advantages of anthracite during the coming winter was announced last month by the Anthracite Institute, following approval of the project by its board of directors Dec. 9. Commitments totalling more than \$650,000 for 1948 have been made by producers representing about 60 percent of the industry's production, and other producers are being invited to join so as to increase the funds available as much as possible.

Use of large-size advertisements every other week in leading newspapers in the primary anthracite marketing area will be supplemented by advertisements in consumer magazines and trade publications. The first advertisement in the campaign appeared in New York City papers Dec. 17 and was expected to begin in other newspapers within two weeks. Promotional material planned will include folders, booklets, dealer helps and other direct-mail material.

Major purpose of the campaign, said Frank W. Earnest Jr., institute president, is to inform the public of the favorable supply situation and help consumers make the best use of anthracite. "This advertising campaign," Mr. Earnest said, "is planned as a continuing feature of the industry, to emphasize current and long-range advantages of anthracite as a home-heating fuel."

U.M.W.A. Quit A.F.L.; New Demands Reported

With a characteristically terse and dramatic note scrawled on a slip of paper, John L. Lewis Dec. 12 withdrew the U.M.W.A. from the A.F.L. for the second time in his career. In making the announcement, Mr. Lewis called reporters to his office and showed them the note written in crayon, which read: "Green, AFL. We disaffiliate. Lewis, 12/12/47." The action was no surprise and had been momentarily expected since Lewis' rebuff at the A.F.L. convention last October. Jurisdictional disputes between District 50 and various unions in the A.F.L. were also thought to be a factor in the withdrawal, and increased activity by District 50 was to be expected. The desire

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to use U.M.W.A. funds and membership independently in the coming presidential election was also thought to be a consideration.

In a statement Dec. 15, William Green, president, A.F.L., mildly reproved Lewis for his action and pointed out that the convention's action in regard to the Taft-Hartley bill had been passed by a two-thirds vote and that the "democratic way" called for all delegates abiding by such a decision. Foes of the two organizations would be made happy, he said. However, he left the door open for the return of the U.M.W.A., urging that they reconsider their decision.

Also on Dec. 12, the U.M.W.A. announced that Thomas Kennedy had been named vice president, succeeding John O'Leary. John Owens, Cambridge, Ohio, was made secretary-treasurer.

A demand that bituminous operators agree to a pension of \$1,200 yearly for all miners reaching 60 years of age with 20 years of service was made by John L. Lewis at a recent meeting of the trustees of the Health and Welfare Fund, according to an unconfirmed report appearing in the N. Y. Times Dec. 17. Actual costs of the plan are not known at the present time since it is not known how many miners reach the age of 60 each year or how many have already reached that age. Some operators have estimated that with such a pension the present tax of 10c. a ton would be raised to nearly 40c. a ton. It was understood that operator representatives were particularly objecting to the provision that the pension payments were to be turned over to the union for separate administration, feeling that this would obligate them to continue payments annually regardless of business conditions.

B.C.R. Ups Budget For 1948 Research

An appropriation of \$539,300 for its 1948 program was voted by the board of directors of Bituminous Coal Research, Inc., at a meeting in Pittsburgh Dec. 10. Expenditures during 1947 totalled approximately \$429,000. Reports given at the meeting indicated that some projects are nearing completion while others require considerable time and money. Heavy concentration is to be put on a few projects urgently needed by the industry and consumers, it was reported, with a few projects to be started in 1948.

Oil Shortage Grows; Coal Supply Holds Up

Shortages of fuel oil for home heating and industrial use continued to cause grave concern as government and industry leaders acted during the month to effect measures for conservation and increase of transport facilities. Supplies of anthracite and bituminous coal were expected to be ample to meet all needs, although some switching of sizes might be necessary, representatives of the two industries maintained. The situation was being aggravated by considerably colder weather than last year. The average weather from Sept. 1 to Dec. 14 in the five eastern cities regularly reported by the Anthracite Institute, for example, was 29.5 percent colder than that for the same period in 1946.

On Dec. 21, governors of 28 states were asked by Sen. Charles W. Tobey (R., N. H.), chairman of a subcommittee of the Senate Committee on Interstate and Foreign Commerce, to consider the appointment of local emergency fuel coordinators as a step towards overcoming shortages in their areas. The request was based on a report of an industry committee appointed by the Senate group following a round-table conference of industry and government representatives in the Senate Dec. 9. Copies of the industry committee's report were sent to the governors and their attention was called to the proposal that coordinators be appointed to handle problems of distribution that may develop, especially between suppliers and distributors. The group estimated that there was a 15-percent deficit in fuel-oil supplies for New England and the north Atlantic seaboard states and a 10-percent deficit in some other parts of the

Coal, Business and Industrial Activity

		1947 to This Date	1947 Over 1946 to Date
Est. anthracite prod., wk. end. Dec. 13.....	1,198,000	54,516,000	— 6.1
Est. bituminous prod., wk. end. Dec. 13.....	13,495,000	590,455,000	+17.1

Source: U. S. Bureau of Mines and the U. S. Bureau of Census.

	Bituminous Coal Stocks [Thousands, net tons]			Consumption [Thousands, net tons]			
	Nov. 1, 1947	Days Supply	Oct. 1, 1947	Nov. 1, 1946	Oct., 1947	Sept., 1947	Oct., 1946
Electric power utilities	16,772	64	16,154	15,638	8,121	7,616	6,708
Byproduct coke ovens	7,310	27	6,216	6,593	8,278	7,658	7,814
Beehive coke ovens.....	a	a	a	a	965	916	837
Steel and rolling mills.....	1,076	40	1,089	1,024	826	741	828
Cement mills	1,049	46	909	1,062	704	662	693
Other industrials	15,632	38	15,758	18,093	12,604	10,627	10,211
Railroads (Class I).....	6,305	22	6,227	9,274	9,048	8,450	9,571
Retail dealers	2,132	9	2,017	3,392	7,754 ^b	7,036 ^b	9,984 ^b
Total	50,276	32	48,370	55,076	48,300	43,706	46,646

Source: U. S. Bureau of Mines. ^aNot available. ^bRetail dealer deliveries.

	Latest Week*	Month Ago	Year Ago
Business Week index of Business Activity, week end. Dec. 13.....	192.9	186.9	184.7
Steel ingot operations (% of capacity).....	97.8	97.0	83.9
Electric power output (million kw.-hr.).....	5,327	5,084	4,778
Crude oil prod. (daily avg., 1,000 bbl.).....	5,253	5,257	4,717
Misc. & L.C.L. carloadings (daily avg., 1,000 cars).....	88	89	87
All other carloadings (daily avg., 1,000 cars).....	58	63	34
Prices, spot commodity index (Moody's, Dec. 31, 1931 = 100)....	455.9	448.2	374.0
Prices, industrial raw materials (B.L.S., Aug., 1939 = 100).....	292.4	292.1	259.5
Prices, domestic farm products (B.L.S., Aug., 1939 = 100).....	412.5	396.7	315.9
Prices, finished steel composite (Steel, ton).....	\$76.09	\$76.09	\$64.73
90 stocks, price index (Standard & Poor's Corp.).....	119.3	120.9	120.7

*Date of latest week for each series on request.

country. Adoption of strict conservation measures by householders also was recommended.

Considerable switching from coal to oil, in addition to transportation difficulties resulting from the lack of tankers and tank cars, was cited by some authorities as a contributing factor in the present crisis. One large oil company, the Standard Oil Co. of N. J., announced that it had converted steam boilers at its Bayway, N. J., refinery from oil to coal.

Before both the hearing of the Senate subcommittee Dec. 9 and at a fuel conference called by Secretary of the Interior Krug for the same day, coal industry representatives reiterated their stand that the industry would meet all demands and that rationing and governmental restrictions would be both unnecessary and harmful. Bituminous production for the week ending Dec. 13 was estimated at 13,500,000 tons, and the N.C.A. estimated that by Dec. 20 production for the year would total 604,000,000 tons, with the final figure for the year depending on the actual work during the holiday period.

New Developments

● Plans for a large-scale development that is expected to eventually yield 300,000,000 tons of coal from the Leatherwood field in southeastern Ken-

tucky, lying between the Hazard and Harlan fields, were recently revealed in a joint announcement by the Louisville & Nashville R.R., The Kentucky River Coal Corp., the Jewell Ridge Coal Corp. and the Fourseam Coal Corp. The program calls for construction of a 5½-mile spur by the L. & N. to open up the almost virgin territory, a new 8,000-ton-a-day operation and a new central cleaning plant with a capacity of 10,000 tons daily.

Coal in the Leatherwood field was first opened up in January, 1945, when the L. & N. completed an 11-mile spur line up to Clover Fork and the Blue Diamond Coal Co. began mining of a 15,000-acre lease in the area. About 5,000,000 tons annually is expected from the territory when maximum production is attained about 1950. The new railroad line will cost about \$1,000,000.

In announcing the new mining operation, Dr. Huston St. Clair, president, Jewell Ridge Coal Corp., and R. H. Kelly, president, Fourseam Coal Corp., issued a statement that their respective companies had ratified a lease agreement with the Kentucky River Coal Corp., Lexington, Ky., a large landowning company in the field, for the construction and operation of a modern, wholly mechanized mining operation with a daily capacity of 8,000 tons. The principal seam to be mined ranges in thickness from 60 in. to 77 in., and although it has certain characteristics of premium coals of both the Harlan and Hazard fields, it could not be correlated with any other

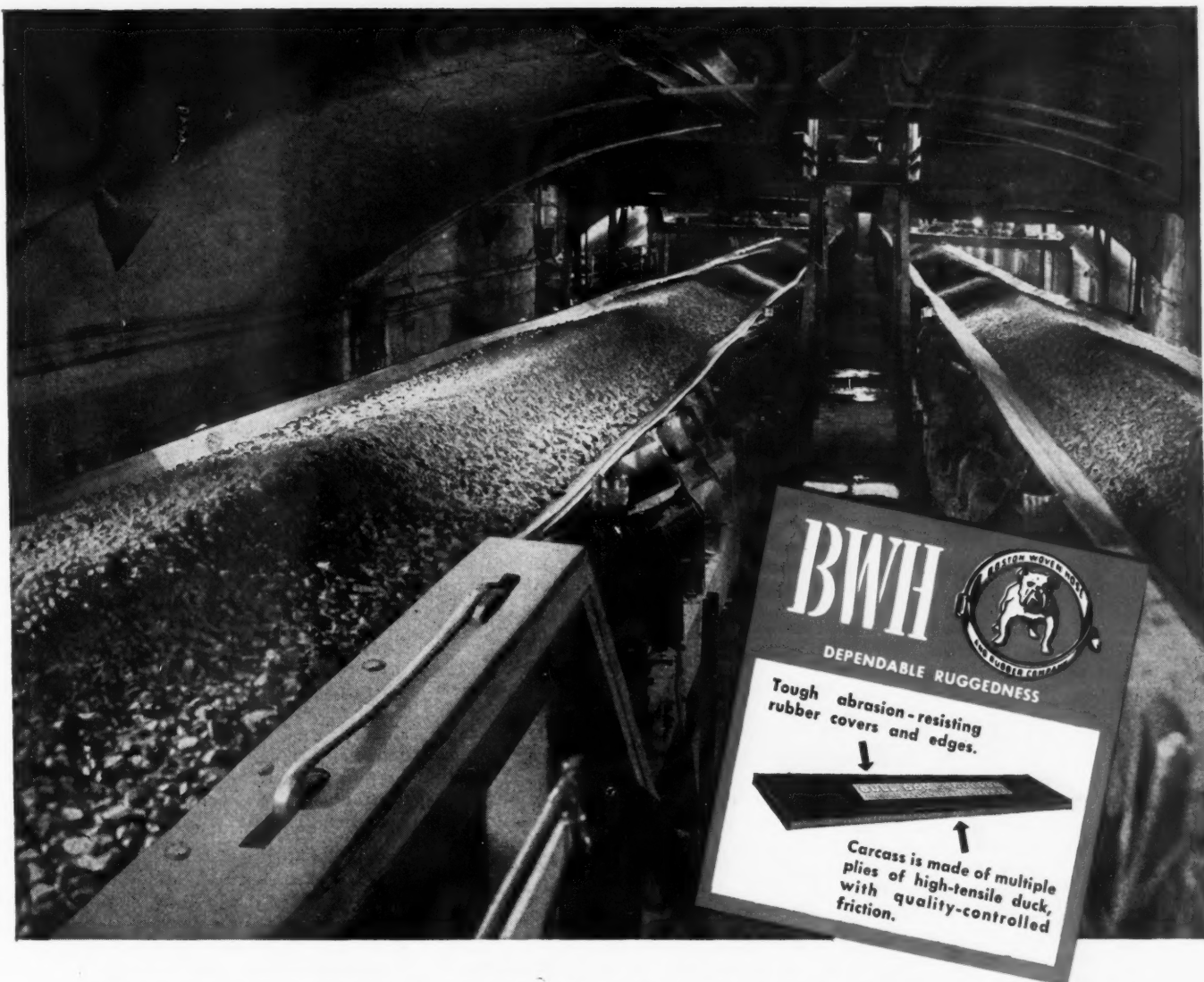
seam, it is reported, and is known as the Leatherwood. According to reports, it is a premium splint coal excelling in quality most other premium coals produced in the high volatile district. Its B.t.u. yield is above 14,000, with an extremely low ash and sulphur content and its fusing temperature makes it adaptable for domestic stoker use, it is said.

The two mining companies plan a joint tippie, which will be located near the head of Blair Fork of Leatherwood and receive coal from both sides of the valley. The mines will have a joint capacity of 160 railroad cars a day and will be equipped with Joy cutting machines, mechanical loaders and shuttle cars.

The new central cleaning plant, which is to be built at some distance from the mines, at the classification yards of the L. & N. at Ravenna, Ky., also is expected to be a factor in development of the field since the plant will handle not only the Leatherwood product and that of the Fourseam Coal Corp., but it is the plan of the operators to make its facilities available to other mines in the Hazard field. A number of small operators are expected to benefit from the new facility, which will have a capacity of 10,000 tons daily.

● Purchase of the Carter Coal Co., and immediate reopening of its three mines closed since the government ceased operation last June, was announced late in November. Purchaser of the West Virginia operations, which produce about 1,000,000 tons annually, was a group headed by Frank Purnell, president, Youngstown Sheet & Tube Co.; Leigh Willard, president, Interlake Iron Corp., Cleveland; and H. G. Hilton, president, Steel Company of Canada Ltd., Hamilton, Ont. Mr. Purnell is chairman of the board of the new company, Mr. Willard, president, and Mr. Hilton, vice president. The group made the purchase, it was understood, to maintain a source of low-volatile coal for steel-plant use. Picklands Mather & Co. was to operate the mines and the former managerial and supervisory staff was to be retained, it was reported. A contract covering the working force was immediately signed by the new management with the U.M.W.A., it was announced. Refusal of J. W. Carter, former owner of the properties, to agree to the current bituminous contract had kept them closed since they were returned to him by the government.

● Acquisition of the Christopher Mining Co.'s No. 6 mine at Four States, Marion County, W. Va., by the Rochester & Pittsburgh Coal Co., Indiana, Pa., was announced Dec. 15. "Several million dollars" was involved, it was reported. The property reportedly includes about 3,500 acres of unmined Pittsburgh coal and has been producing nearly 60,000 tons monthly, with 300 men employed.



UNDERGROUND "TOUGHIES" SENT UP FOR 19 YEARS

Another top performance by a **BWH** product

19 years ago, in 1929, a leading copper concentrator needed a conveyor belt that could really "take it". Ponderous weights of copper ore had to be hauled from a primary crusher to the pulverizing mills. The belt had to resist cuts and tears from jagged rocks. And the cargo had to keep moving, week after week, at a minimum cost per ton.

It was a tough problem, but a Bull Dog Belt proved a highly satisfactory solution. In 12 years of steady operation, this husky belt carried more than 54 MILLION TONS! So when stepped-up production necessitated a

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Because Bull Dog Belts are made by the famous ROTOCURE process of continuous vulcanization, they are free from trouble spots caused by press overlaps. The carcass is made of multiple plies of duck with quality-controlled friction, and the cover is unusually tough and abrasion-resistant. Combined, these factors assure the resiliency essential to recovery from shock when "bruiser" loads come thundering in.

The new belt shown has been hard at work for over seven years, at the

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● Formation of the Chafin-Smith Coal Co., Huntington, W. Va., and plans for development of 2,440 acres of coal lands on Rich Creek, Logan County, were reported last month. Officers of the new firm, which has an authorized capital of \$300,000, are: Arthur Chafin, president, John Chafin, vice president, Frank P. Smith, secretary-treasurer, Don Chafin and Larry Derenge, additional members of the board. The first mine will open up a 1,240-acre section of the land owned by Don Chafin, father of Arthur, William and John Chafin, associates in the firm. Initial production of 1,500 tons daily is expected, with an eventual output of 3,000 tons daily. A second area is to be developed later. The C. & O. Ry. has begun a one-mile track extension and preliminary work on the mine has begun, which will eventually be a mechanized operation, with coal-cleaning facilities, it is understood. Mr. Derenge, formerly mine superintendent for the Island Creek Coal Co., is in charge of the work.

● Plans for the opening of two new mines on property leased on Stonecoal Creek and thought to contain about 3,500,000 tons of coal, have been announced by the C. H. Mead Coal Co., East Gulf, W. Va. According to W. B. Sweazy, general superintendent, one mine will be a drift operation scheduled to open in mid-January and will be known as East Gulf No. 4. The Pocahontas No. 4 seam will be mined and about 2,188,000 tons of coal is thought available. Hand-loading methods are expected to be necessary for about eight months, he said.

The second operation, scheduled for April, will be a strip pit expected to produce about 800,000 tons of outcrop coal over a 10-year period. The company also plans expansion of production at its other three mines from 3,000 tons daily to 3,500 or 4,000, Mr. Sweazy reported.

● Large-scale stripping development in the Elk Mt. district, Carbon County, Wyoming, was expected to get under way shortly after the first of the year, according to an announcement by Lawrence Loechner, head of the newly formed Shirley Coal Corp., Omaha, Neb. The company was said to have already begun movement of machinery to the area, which includes 1,100 acres of land. A 1,600-ft. spur track and loading tipples will be erected on the Saratoga & Encampment Ry. south of Walcott and coal will be trucked from the mine, it is reported. According to William H. Bonham, superintendent, plans call for shipping 200,000 tons by April 15 and employment of some 250 men when full operation is reached. Coal is to be crushed at the mine and two grades are to be marketed.

● Experimental stripping of coal land in the Pictou area of Huerfano County, near Walsenburg, Colo., has been undertaken by Cooley Bros., Denver,

MEETINGS

● Mining and Metal Industry Committee, A.I.E.E.: winter meeting, Jan. 26-28, William Penn Hotel, Pittsburgh, Pa.

● A.I.M.E.: annual meeting, Feb. 15-19, Pennsylvania Hotel, New York.

● Chicago Stoker Exposition, under the auspices of Chicago Merchants Association and Midwest Stoker Association: Mar. 11-17, Commonwealth Edison Assembly Hall, Chicago.

● Canadian Institute of Mining and Metallurgy: Golden Jubilee and annual meeting, week of Apr. 6, Vancouver, B. C., Can.

● Tenth Annual Midwest Power Conference, sponsored by Illinois Institute of Technology: Apr. 7-9, Sheraton Hotel, Chicago.

under contract with the Colorado Fuel & Iron Corp., it is reported. Capacity of the operation is 500 to 600 tons daily, with about 80,000 tons available in two seams being mined. The lower seam is said to be 4 ft. thick at a depth of 25 to 35 ft., with the upper seam somewhat thinner.

● Resumption of production at its D mine, Superior, Wyo., on Dec. 1, was announced by the Union Pacific Coal Co. The mine, which will employ about 75 men, had been closed since April, 1944, because of labor shortages. The company reported that a 40-unit housing project at Superior probably would be completed during December and that a 14-unit development at Hanna also was about completed.

● Acquisition of the Cameo Mining Co., Cameo, W. Va., by the Michigan & Southern Coal Corp., Columbus, Ohio, was announced last month by Clifford L. Fishback, president of Michigan & Southern and also vice president of the Elk River Coal & Lumber Co. Officers of the company elected for the coming year included Mr. Fishback, chairman of the board, Frank P. Smith, president, and Wayne P. Ellis, vice president and treasurer. The mine, in Boone County, W. Va., mines the No. 5 block seam, on the C. & O., and produces about 1,300 tons daily. The Michigan & Southern Coal Corp. will continue to act as exclusive sales agents.

● Rothey Bros., Elizabeth, Pa., is reported to have leased from the State of West Virginia 50 acres of coal land under the West Fork River at Worthington, Marion County, and plans to strip the area by diverting one side of the river at a time. About 100,000 tons of coal is thought to lie beneath the stream bed, with overburden ranging from 20 to 40 ft.

● The W. L. Pursglove Coal Co., Clarksburg, W. Va., has reportedly acquired a 5,000-acre tract of Kitaning coal in Barbour County, West Virginia, for development and exploration purposes, with rights to strip-mine 1,000 acres of the area.

● Sale of the Booth mine of the Diamond Alkali Co. to the Pittsburgh Consolidation Coal Co. was recently reported. The mine, operated by the River Seam Coal Co., is located near Brady, on the Monongahela R.R.

● Purchase of the Wilhelm Coal Co., St. Clairsville, Ohio, by the Hanna Coal Co. is understood to have added 300,000 tons annually to Hanna's production. The company operates a strip mine between New Athens and Fairport, Ohio.

Personal Notes

Glen Alden Coal Co., Scranton, Pa., has elected, effective Jan. 1, **Henry A. Dierks** vice president and general manager, and **F. Edgar Kudlich** mining engineer. Mr. Dierks, who was formerly mining engineer in charge of all Glen Alden engineering operations, joined the company in 1943, after many years of coal mining experience in Europe and this country. Mr. Kudlich, who succeeds Mr. Dierks, joined Glen Alden last Dec. 1 as senior assistant mining engineer. He was formerly special engineer for the Jeddo-Highland Coal Co. Also effective Jan. 1, **William W. Everett** was named general superintendent; **Fred L. Kipple**, division superintendent, southern division, and **H. Merton Ruth**, division superintendent, northern division.

Paul L. Shields, formerly vice president and general manager, U. S. Fuel Co., Salt Lake City, Utah, has been elected president, Sheridan-Wyoming Coal Co., Inc., Monarch, Wyo., succeeding **D. H. Pape**, who retired Jan. 1 at his own request. Mr. Pape, who has been active in the industry for many years, has been a member of the board of directors of the N.C.A. and for some years was president of the Lion Coal Co., Ogden, Utah.

Walter Hornsby, assistant chief, Kentucky Department of Mines and Minerals, resigned, effective Jan. 1, to become superintendent, Blue Pennant mine, Glogora Coal Co., Blue Pennant, W. Va., a position held for the last 20 years by his brother Ernest until his death Dec. 1.

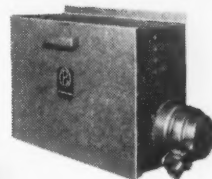
Mathew Turk, formerly preparation plant manager, has been appointed chief engineer, Pond Creek Pocahontas Co., Bartley, W. Va., succeeding **Mark Largen**, resigned.

Willard J. Crawford has been named general manager, Enos Coal Mining Co., Oakland City, Ind., succeeding the late **William H. Nichol**. Mr. Crawford was previously associated with the sales department of the company, with headquarters in Indianapolis.

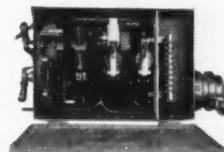
Harold A. Tapert has been appointed Detroit district manager for Coal Heating Service Division, NCA, replacing **A. F. Arbury**, who will rejoin the Pocahontas Operators Association



1 Rugged Steel Case Withstands Mine Usage.



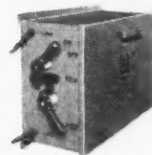
2 Simple Parts Arrangement Affords Quick, Easy Maintenance.



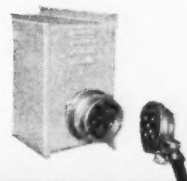
3 Positive Timing Circuit Assures Proper Operation.



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Feb. 15. Mr. Arbury has been on loan to Coal Heating since Nov. 1, 1946. Mr. Tapert brings to his new position a varied experience in advertising and sales work.

Walter Davis, formerly section foreman, Zeigler No. 1 mine, Bell & Zoller Coal & Mining Co., has been appointed to a similar position at Kathleen No. 2 mine, Union Colliery Co., Dowell, Ill.

Driscoll Scanlan, Illinois state mine inspector for District 12, resigned Dec. 4.

Pearl Elkins, McRoberts, Ky., has been appointed a Kentucky district mine inspector.

C. B. Lang, executive vice president, Dominion Steel & Coal Corp., Ltd., Dominion Coal Co., Ltd., and Nova Scotia Steel Co., Ltd., Montreal, has been named president of the three companies and subsidiaries, succeeding Arthur Cross, who becomes chairman of the boards of the companies.

Foreign Developments



London—In a year-end review and forecast for 1948, Lord Hyndley, chairman, National Coal Board, Dec. 22 outlined large-scale plans to modernize the British mines, increase mechanical equipment and improve coal quality and quantity. A speeded-up program of installation of cutters, conveyors and haulage locomotives is proposed, but a major difficulty in implementing the plans is foreseen in a shortage of steel for steel props to replace present wooden timbers as planned. Lighting also is an important part of the program and it was reported that fluorescent lighting, incapable of igniting gas, was now being tested in nine mines. According to the report, deliveries of coal cutters in 1947 were to total 800, with deliveries of more than 1,000 planned in 1948, as compared with a total of 677 in 1946. Conveyor deliveries were: 1,982 in 1946; an estimated 2,900 in 1947; and 4,000 planned for 1948.

British coal production for the week ending Dec. 13 was reported at 4,336,000 long tons, the highest weekly production in seven years. In achieving increased production in recent weeks, British miners have voluntarily been working an extra half-hour daily or an extra Saturday shift every two weeks. Regular exports of coal to Western Europe, at a possible rate of

approximately 200,000 tons weekly, were expected to begin shortly.

Germany—Although Ruhr miners have built up a credit of \$5,000,000 under a plan that offered them a share in coal-export proceeds, in addition to extra clothing and food, in return for boosted production, great difficulty in purchasing food in other countries was reported early in December. According to Heinrich Kost, general director of the German coal management, the food situation was still critical even though the miners are not complaining as loudly as they have in the past. At the end of November, coal production in the Ruhr was averaging 280,000 tons daily, the highest since the end of the war and nearing the year-end goal of 300,000 tons daily. A critical situation in mine props was reported later in December, however, with the mines having only a 2½ weeks' supply on hand. Lack of transportation was said to be the chief factor in the shortage. A three to four months' supply is desirable at the start of the winter, it was reported, although the Ruhr mines started last winter with only a two months' stock on hand.

Canada—In an effort to improve Canada's supply of American dollars, the Canadian government will initiate a drive to increase the domestic coal production, according to Reconstruction Minister C. D. Howe. The coal subventions recommended by a Royal Commission of Inquiry into Coal in Canada and implemented by the Canadian Government were based on the situation where Canadian coal producers had a protection of 50c. a ton on anthracite and 75c. a ton on bituminous coal from the United States. However, under the Geneva Agreements, which became effective Jan. 1, 1948, anthracite enters Canada free and the tariff on bituminous coal is cut to 50c. In reply to the question whether with the lowered duty it would be necessary to increase the subventions, Mr. Howe said that the Canadian government was wedded to the subvention policy with regard to coal and it was determined that as much coal as possible should be produced in the country.

More than 12,000 Nova Scotia coal miners, whose basic daily wage is \$6.84, will receive wage boosts of 40c. a day, it was reported after conferences at Glace Bay, Nova Scotia, between officials of U.M.W., District 26, and Dominion Steel & Coal Corp. Freeman Jenkins, the union's district president, said that the increases, effective Dec. 1, would apply not only to miners who had reached company-set production objectives but to the 6,000 men in the South Cape Breton fields who missed their goal by a fifth of a ton per man-day.

The wage increase, conditional upon attaining pre-war production levels, was one of the terms which settled last spring's 100-day general coal strike when miners were granted an unconditional boost of \$1 a day. Production,

which had fallen off from the 1939 average of 2.5 tons per man-day, had to be restored to that level with November as the test month. When all the figures were in, all the pits operated by Dosco's associated and subsidiary companies on the Nova Scotia mainland and in North Cape Breton had hit the target. But miners in pits south of Sydney Harbor had averaged only 2.25 tons a man-shift.

Australia—The announcement by Premier Hanlon of Queensland that an agreement was to be signed between the government and the Electric Supply Corp. of England for the development of the Blair Athol coal deposits has been hailed by industry leaders as a tremendous step forward in the industrial development of Australia, and perhaps the greatest event industrially for a century. An expenditure of \$32,500,000 is proposed over a five-year period to produce 3,500,000 tons of coal annually by the open-cut method. Costs of production are reportedly expected to be lower than any other part of the world and a large export trade is planned. A railway direct to the coast and the construction of a special coal port also are on the schedule at a cost of \$3,250,000, while a fleet of colliers to cost \$25,000,000 also is envisaged, if necessary to handle the overseas and interstate trade. Two small companies at present operating on the field will be taken over by the new company. In view of the present hand-to-mouth existence of industry on coal supplies from the NSW coal fields, the move will be welcomed by industrialists in all Australian states, it is reported.

Moscow—A wide program for the extension of training of coal-industry engineers as well as refresher courses was outlined for the current school year in an order recently issued by S. Kaftanow, minister of higher education. The number of engineers to be trained will increase more than fourfold in the next few years, it has been reported. At present, there are a score of institutes and departments throughout the country where engineers for the coal industry are trained. Plans are now under way to enable seven more such institutes to train mining technicians, and the network of secondary schools also is being extended.

New Coal Docks Planned For Toledo Lake Trade

The most modern coal and ore docks on the Great Lakes, now being built jointly by the N. Y. Central and Baltimore & Ohio R.R.s., will open next spring, according to an announcement Dec. 11. The installation will have a capacity of 20,000,000 tons of coal and 4,500,000 tons of ore a year. The railroad yard being constructed will have 56 miles of track and a capacity of 5,400 cars. The three coal-dumping machines will each be capable of unloading a railroad car a minute.

Another Actual Test taken by Coal Inspectors on a Chance Process Installation



United Engineers & Constructors Inc.

GAY MINING CO.
DAILY WASHING PLANT REPORT

Tipple Copy
Sand Used **800 LB** Washing Gravity **150** Shift **FIRST** Date **10 - 27** 1047

TIME	GRAVITY VALVE SETTING				AMMETER		Circ. Pump Gauge	Trapp. Cycle	Lbs. Sand Added	% SIZES IN CLEAN COAL						% Yield in Refuse	
	Class	No. 1	No. 2	No. 3	No. 4	Sand P.				Agit.	Size	%	Size	%	Size		%
8:45	.60	4.12	4.12	4.12		38	6	12	3 1/5	0	1/4 x 1/4	0.5	1/4 x 2.0	0	2x600	1x60.1	
9:00	"	"	"	"	"	"	"	"	"	0	800	1/4 x 1/4	0.4	1/4 x 2.0	0	2x600	1x60.2
12:15	"	"	"	"	"	"	"	"	"	0	1/4 x 1/4	0.6	1/4 x 2.0	0			
1:00	"	"	"	"	"	"	"	"	"	0							
2:00	"	"	"	"	"	"	"	"	"	0							

Ave. Time of Delay	No. Min. Delay	Part Causing Delay	Repairs if Necessary	No. Min. Mine Idle	REMARKS
8:10	10	no coal			
11:15	30	" + lunch			

* Figure No. Minutes Mine Was Idle Due to Breakdown After Bins Are Filled. Write Additional Delays On Back of Sheet.

C. Charles Dillon
Operator.

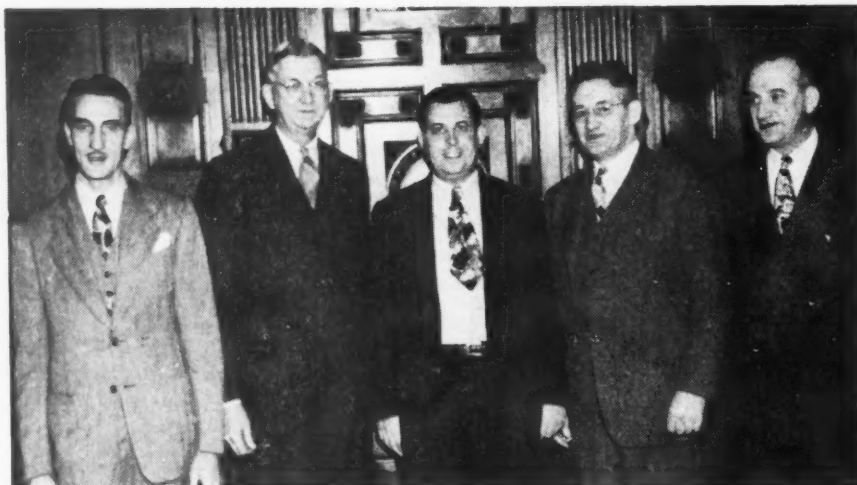
Here is another actual case where the Chance Cone Process afforded great savings. You may obtain similar results in your own plant by installing a Chance Process. Write us today for full details and our engineers' help.



THE HEART OF THE PREPARATION PLANT

United Engineers & Constructors Inc

NEW YORK 17 • PHILADELPHIA 5 • CHICAGO 2



J. A. Younkens, Duquesne Light Co., re-elected secretary-treasurer; C. A. McDowell, Jones & Laughlin Steel Corp., retiring president and new director; J. D. Reilly, Hanna Coal Co., speaker at the opening session; C. M. Donohue, Mine Safety Appliances Co., new president; and J. L. Hamilton, Republic Steel Corp., new first vice president.



Carl A. Peterson, Northwestern Mining & Exchange Co., and J. A. Boyle, H. C. Frick Coke Co., who addressed institute members Thursday afternoon.



Heath S. Clark, president, Rochester & Pittsburgh Coal Co., toastmaster, and Dr. James Boyd, director, U. S. Bureau of Mines, principal speaker at the annual banquet.



A. J. Nairn, C. H. Curry and C. H. Maize, state mine inspectors, who discussed new Pennsylvania mining laws.

C.M.I.A. Marks 61st Year

COAL-MINING MEN who gathered for the 61st annual meeting of the Coal Mining Institute of America, in Pittsburgh, Pa., Dec. 11-12, elected new officers for 1948 and heard speakers discuss a wide range of subjects that included labor relations and proper work habits, safety, roof support for main-line haulage and face areas and recent changes in Pennsylvania mining laws. More than 675 members of the Institute at the annual dinner Thursday night listened as Dr. James Boyd, newly appointed director of the U. S. Bureau of Mines, urged cooperation by the coal industry, labor and government in solving their problems and declared that "there is no room for lasting disagreement in view of the gigantic

tasks we face." Featuring the closing session Friday afternoon was a six-man panel that answered written questions submitted on the first day of the meeting.

Committee reports occupied the first part of the opening session Thursday morning. M. D. Cooper, manager of vocational training, National Coal Association, and chairman, committee on vocational training, cited a 13-percent increase over 1946 in the number of high-school students enrolled in mining courses in Pennsylvania and discussed the need for a better public opinion of the coal industry and a closer relationship between mines and schools in coal-mining areas. W. G. Thomas, Pennsylvania Department of Mines, and

chairman, committee on explosives, discussed lifting of the 3-lb. limitation on explosive charges under certain conditions after Jan. 1, 1948. E. J. Gleim, U. S. Bureau of Mines, and chairman, committee on flame-resistant properties of trailing cables, reviewed Bureau procedure for testing trailing cables.

The annual president's address, delivered Thursday morning by C. A. McDowell, retiring president of the institute and manager of industrial relations, Coal Division, Jones & Laughlin Steel Corp., was a recital of the institute's history from its beginnings, revealing the foresight of its founders and pointing out similarities between early and present-day thinking on technical problems, the



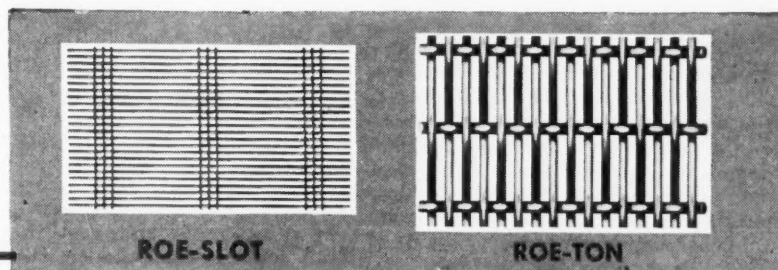
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STAINLESS STEEL IS NOT A CURE-ALL, but it's the *perfect solution* for most corrosion problems. In thousands of applications where corrosion quickly destroyed other types of screens, Roebling Stainless Steel Wire Cloth has stopped the need for premature replacements.

Roebling Stainless Steel Wire Screen is precision-woven and its uniformity holds firm. Its smooth surface greatly reduces any tendency to clog. All in all, it brings greater screening accuracy, less need for re-processing, and increased production.

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**CORROSION
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WIRE ROPE AND STRAND ★
FITTINGS ★ LAWN MOWERS ★
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CABLES ★ AIRCORD, AIRCORD
TERMINALS AND AIR CON-
TROLS ★ AERIAL WIRE ROPE
SYSTEMS ★ ELECTRICAL
WIRE AND CABLE ★ SLINGS ★
HARD, ANNEALED OR TEM-
PERED HIGH AND LOW CARBON
FINE AND SPECIALTY WIRE,
FLAT WIRE, COLD ROLLED
STRIP AND COLD ROLLED
SPRING STEEL ★ SCREEN,
HARDWARE AND INDUSTRIAL
WIRE CLOTH ★ SKI LIFTS



ROEBLING

A CENTURY OF CONFIDENCE



J. E. Elkin, Duquesne Light Co.; W. D. Walker Jr., U. S. Bureau of Mines; W. D. Northover, Rochester & Pittsburgh Coal Co.; Anthony Shacikoski, Leechburg Mining Co.; W. R. Cunningham, state mine inspector; and C. Zotter, Butler Consolidated Coal Co. These men discussed modern methods of roof support.

social, moral and financial standing of miners, duties of supervisors, certification, underground haulage, pneumatics, afterdamp and safety. Showing, among other things, how little the principles of safety have changed through the years, Mr. McDowell quoted as follows from an address delivered to the institute in 1900: "Accidents happen not from lack of knowledge but from lack of vigilance and common sense."

"About 20 percent of your coal miners are leaders," said J. D. Reilly, vice president (operations), Hanna Coal Co., St. Clairsville, Ohio, who was the second speaker Thursday morning. Half of this 20 percent probably will become management men, the other half, union leaders, Mr. Reilly continued. If the management half of this group is well organized, informed and harmonious, the chances for sound labor relations are good. To develop this kind of leadership, there must be (1) freedom of expression among supervisors, (2) reduction of petty jealousies by frank discussion, (3) award of credit where credit is due and (4) constructive, straightforward criticism of supervisors by top management. "A mine that has no strikes does not necessarily have good labor relations," Mr. Reilly declared, pointing out that efficiency is the best measurement of labor relations and that when efficiency drops low, management must take a firm stand and demand a fair day's work for a fair day's pay. On the other hand, management is under obligation to look for something good among workers. It all adds up to application of the Golden Rule as the key to good labor relations, Mr. Reilly concluded.

The coal industry suffers from lack of proper work habits among miners, declared Carl A. Peterson, assistant to the vice president and general man-

ager, Northwestern Mining & Exchange Co., Dubois, Pa., who was the first speaker at the Thursday afternoon session. Mr. Peterson listed the following obstacles to the development of proper work habits in the coal industry: (1) concentration of operators on machinery and mining methods, (2) placing only secondary emphasis on the human element, (3) failure to understand human nature, (4) failure to agree on what are good work habits, (5) failure to create an atmosphere in which work habits can be taught and (6) absence of mutual confidence between management and men.

Careful spade work by management is needed to put proper work habits across, Mr. Peterson stated. This involves (1) teaching workers the necessity and advantages of good work habits, (2) informing foremen and other supervisors ahead of time and (3) treating each worker as an individual and giving him the facts in the way he best understands them. Management must be willing to make changes gradually, plan carefully and check progress step by step, Mr. Peterson concluded.

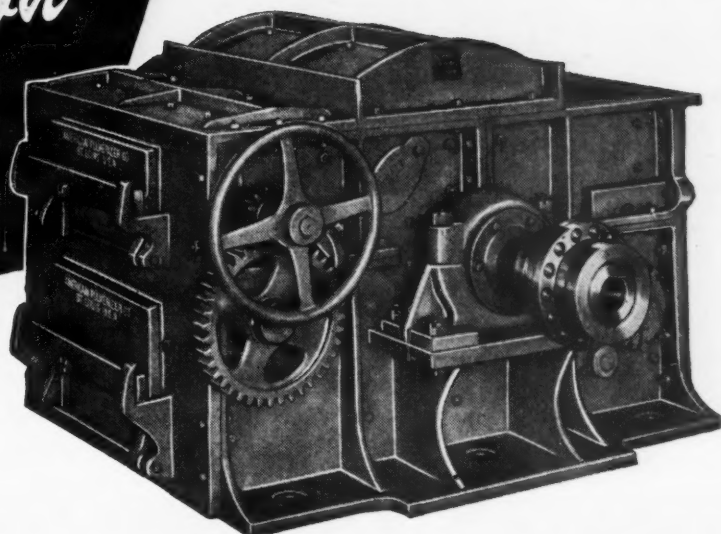
Comment from the floor on Mr. Peterson's address included the following suggestions: that instruction in new work habits come from men on the same level as those who learn; that incentives—praise, reward, fear, etc.—be established for learning; that foremen, recognizing the relation between sound work habits and good labor relations, insist on observance of established work patterns; and that miners themselves be assigned to train other miners.

"Safety is our first consideration," declared J. A. Boyle, chief mine inspector, H. C. Frick Coke Co., Uniontown, Pa. Citing safety methods and devices in his company's mines, the

speaker listed the following: (1) allaying coal dust—sprinkling systems throughout haulage roads and at working faces; automatic sprinklers close to hoisting shafts and underground dumping stations; and rock-dusting on all haulage roads, back headings, air courses and to within 80 ft. of all working faces; (2) fire protection — enlargement of the sprinkling system to provide 100 g.p.m. through two 2½-in. fire hoses with ¾-in. nozzles; fire-hose connections every 600 ft. in the main haulages and at every butt on the flats, with a gate valve every 3,000 ft.; pipes treated inside and outside to resist chemical action; four 250-ft. reels of standard fire hose with couplings, available at all times on four specially-made trucks; quarterly inspection of fire hoses; 1,000 ft. of 4-in. line for emergencies; chemical extinguishers in each section and throughout the mines, together with supplies of rock dust; and suitable maps showing size and location of all water lines; (3) emergency doors to reverse air currents, providing fresh-air and smoke-free escapeways, charted anew on the mine maps every six months; (4) roof control—limit of 10 ft. on width of headings; use of hitch timbering along haulage roads; and a definite plan of timbering in active working places; (5) fall making—use of snatch ropes attached to each crossbar, the main fall rope being carried through the snatch ropes to the last crossbar next to the working face, thus making it unnecessary for any workman to enter the fall area again after a crossbar has been extracted; (6) guarding equipment on all moving parts of machines where danger of accidents may be present; (7) derailleurs out by the working places to protect workmen; (8) automatic couplers on all mine cars for new installation; (9) use of protective clothing; (10) distribution of printed rule books to all employees; (11) trained mine rescue crews; (12) regular inspection of mines by company inspectors; and (13) regular safety meetings for all workmen.

"We are now entering a new coal age," declared Dr. James Boyd, director, U. S. Bureau of Mines, who addressed the institute at the annual banquet Thursday evening. Heath S. Clark, president, Rochester & Pittsburgh Coal Co., Indiana, Pa., was toastmaster. Stressing the growing need for power in our own country and the dependence of European recovery on energy, Dr. Boyd stated that the responsibilities of the coal industry are growing graver each year. He expressed some doubt that the government had kept the public fully informed of the seriousness of the coming fuel crisis, so that the coal industry could meet its responsibilities, and some doubt also that the coal industry had adequately measured its responsibilities to householders. The Bureau chief point-

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go down
TONNAGE
Rises



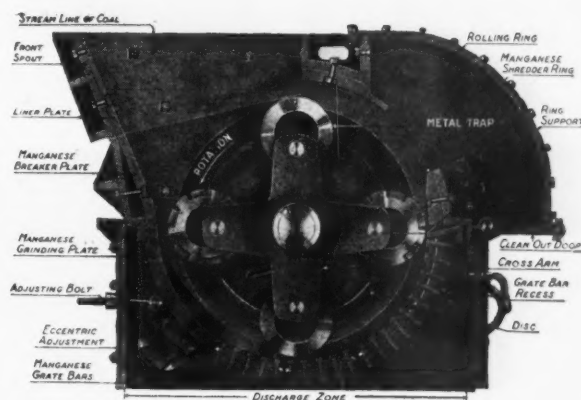
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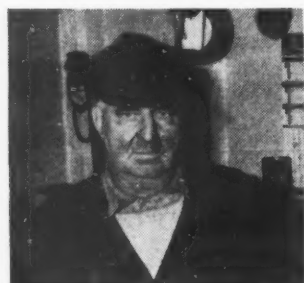


Frank May (left), night foreman, C. E. Norman, Rufus Keathley, Pete Hall and Everett Young, face bosses, Rosedale mine, Diamond Coal Mining Co., Devonia, Tenn.



Frank Harris (left), vice president and general manager, and B. C. Hylton, gen. supt., Lake Superior Coal Co., Superior, W. Va.

COAL MEN



Left to right—John Corden Sr., tippie foreman, Melvin R. Maddy, master mechanic, John Stewart, shop foreman, and K. M. Farmer, supply clerk, Bevier Coal Co., Macon, Mo.



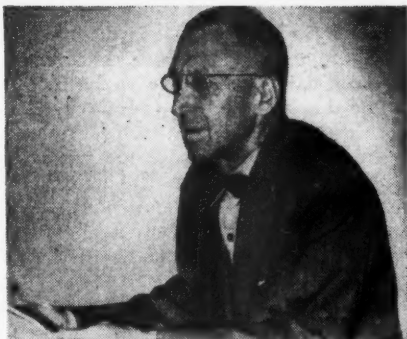
Left to right—G. V. Brown, chief clerk, Eastern Coal Corp., Stone, Ky.; Alex Moore, supply clerk, No. 3 mine, Rail & River Coal Co., Bellaire, Ohio; Carl Newman, supply clerk, and R. D. Van Tuyle, timekeeper, Tiger mine, Hume-Sinclair Coal Mining Co., Hume, Mo.



Kinsley Hopson (left), assistant to the chief engineer, V. L. Hancock, inside superintendent, Mines Nos. 3 & 4, and P. W. Damon, chief engineer, Lake Superior Coal Co., Superior, W. Va.



F. J. Foresman (left), director of personnel, Pittsburg & Midway Coal Mining Co., Pittsburg, Kan.; Nelson Rogers, silviculturist, U. S. Dept. of Agriculture; and Paul Phelps, P & M. farm manager.



A. W. Hesse, recently retired as chief engineer and assistant general superintendent, Nemacolin (Pa.) mine, Buckeye Coal Co.



Sigal Byrd (left), general mine foreman, M. H. Rankin, Wiley Anderson, Hugh Justice, Raymond Walls and Evan Adkisson, face bosses, Rosedale mine, Diamond Coal Mining Co.

ON THE JOB



Left to right—"Si" Nix, mine foreman, R. T. Moore, chief engineer, R. O. Meute, production engineer, and Joe Neilson, inside superintendent, Castle Shannon Coal Corp., Coverdale, Pa.



Left to right—Roy Baxter, electrical engineer, central shop, DeBardeleben Coal Corp., Sipsey, Ala.; Frank Patrick, mechanic, Lancaster No. 15, Barnes & Tucker Co., Barnesboro, Pa.; N. H. Bolick, superintendent, and Ed Moore, tippie foreman, Apex Coal Co., Pittsburg, Kan.



Ed. Gaston (left), electrical engineer, Otis Bledsoe, assistant to general superintendent, and John Dulkoski, bulldozer operator, Georgetown (Ohio) No. 12 mine, Hanna Coal Co.



James H. Truax (left), production engineer, J. M. Provost, superintendent, and George Stachura, safety engineer, Harwick mine, Duquesne Light Co., Harwick, Pa.

ed to the development of synthetic fuels as the key to the coal industry's success in keeping its position of leadership in the fuels industry. In safety, the Bureau will continue to cooperate with the coal industry, Dr. Boyd declared, promising increased emphasis on roof support and further investigation of underground illumination. In concluding, the speaker listed two major responsibilities of the industry and the Bureau: (1) industrial design for better utilization of coal and (2) further development of preparation techniques and facilities to offset depletion of coking coal reserves.

Modern methods of roof support along main haulage lines and in face areas were discussed in six papers read at the Thursday morning session. The haulage-way timbering method described by C. Zotter, engineer, Butler Consolidated Coal Co., Wildwood, Pa., involves cementing hitchbars into the rib on 12-ft. centers, laying stringers on the hitchbars and then laying crossbars on 5-ft. centers on the stringers. I-beams and 70-to-90-lb. rails are used for hitchbars except at crosscuts, where 120-lb. rails are used to give needed strength to wider spans. Trolley and telephone wires are strung along the hitchbars, ground faults being confined by breaking the timbering at 30-ft. intervals. Safer timbering can be erected across crosscuts at 62 deg. than at 45 deg., said Mr. Zotter, illustrating his statement by showing that a crosscut 14 ft. wide requires 19.5 ft. of timbering to span the 45-deg. turnoff as compared with 15 ft. of timbering required by a 62-deg. turnoff.

Remarking that his company uses a hitch-timbering system similar to that described by Mr. Zotter, W. D. Northover, safety engineer, Rochester & Pittsburgh Coal Co., Indiana, Pa., reviewed accident statistics to stress the importance of safe main-line haulage methods. Mr. Northover urged thorough periodic inspection of haulage roads throughout their length and efficient methods of timbering as the best way to reduce haulage accidents. Special attention, he declared, should be given to the quality of timber, whether wood or steel. To guard against dislodgement, timbers should be recessed or should be supported on pins or anchors driven into the rib. His own company, Mr. Northover stated, uses the latter method. Two-pronged steel anchors 24 in. long and made of 1½-in. steel are driven into holes drilled flush with the roof in the sides of the entry. The prongs of the anchor are spaced 4 to 6 in. apart, depending on the size of timber to be used. The protruding end of the anchor is bent down in the shape of a U to permit the end of the roof timber to enter.

The anchors also can be used as two separate prongs with ends turned up. In this case, a ½-in. steel plate 4 in. wide and 8 in. long is placed across

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the ends of the protruding anchors to support the ends of the roof timbers. Holes for this type of support are drilled far enough below the roof to accommodate the thickness of the timber to be used. If bottom is to be taken instead of top and if the coal is soft, a different method is used, involving a recess for the supporting legs on top of the bottom rock. If, because of excessive roof weight, this last method is not satisfactory, holes 6 in. in diameter and almost 4 ft. deep are drilled on 7- or 8-ft. centers in both ribs of the entry and 4-ft. lengths of 80-lb. rail are driven into the holes, with 6 to 8 in. protruding. Stringers of 80-lb. rail then are laid on the ends of these stubs to support the roof timbers.

A timbering method designed to last through short-lived haulage roads was described by J. E. Elkin, superintendent, Warwick mine, Duquesne Light Co., Greensboro, Pa. In this method, face timbering is used as haulage timbering for the life of the haulageway, one to three years. Each rib is sheared to give a secure foundation for pins. A center post is set for support until the cutting machine enters; then the center post is removed and all men are ordered to work from behind the inby timbering. Pin timbering as used in the Warwick mine eliminates cutting and setting leg timbers and the use of timber jacks. Timbermen like the method, and can set a timbering unit in 10 to 12 minutes. Advantages of the system are: greater safety, less exposure of men to untimbered roof, savings in labor and time, economy (an estimated 93c. per cut is saved by pin timbering) and fewer falls of roof.

Proper roof support in face areas requires a careful study of strata lying above the roof, said Anthony Shacikoski, superintendent, Leechburg Mining Co., Avonmore, Pa. To improve roof support at the face, Mr. Shacikoski uses safety crossbars mounted on skids and equipped with

screw-jacks to raise the crossbars up against the roof. The loading machine works under four of these skid-mounted crossbars, which are so built that if the machine strikes them they cannot be knocked over. In fact, if the operator needs more room for his machine, he can turn the skids outward to give his loader a wider span without endangering roof support. By lowering the screw-jacks on the outby timber, the operator can pass it underneath the three inby timbers and re-erect it at the face.

Pin-jack timbering at the face (January, 1947, *Coal Age*, p. 64) was described by W. D. Walker Jr., engineer in charge, U. S. Bureau of Mines, Fairmont, W. Va. In this method, 5x7-in. crossbars are supported by adjustable jacks, which in turn are supported by round steel pins inserted in holes in the ribs. Holes, 1½ in. in diameter, are drilled opposite each other in each rib to a depth of 18 to 20 in. about 5 ft. below the roof line, allowing a 2- to 3-ft. clearance above the floor. Steel pins, 1½ in. in diameter and 15 in. long, with a collar 3 in. from one end, are inserted in the holes, permitting a 3-in. length to extend out. Timber jacks 4 ft. long, with an 18-in. screw adjustment and an inverted U-type foot, are placed on the protruding ends of the pins and support legs for the crossbars.

Among the advantages of this method, Mr. Walker listed the following: (1) reduction of unsupported roof area to a minimum, (2) a 50-percent saving in timbering time, (3) a 25-percent reduction in cleanup time for the loading machine, (4) ability of the loading machine to clean up all coal along the face and sides, thus saving the labor of one cleanup man, (5) no danger of knocking out timbers and (6) reduction of accidents.

A broad survey of timbering methods in the Central Pennsylvania field was given by W. Roy Cunningham, state mine inspector, Johnstown, Pa., whose address concluded the session Friday morning. Mr. Cunningham's study included a survey of minimum timbering requirements, plans for timbering intersections when shuttle cars are used, fore-pole timbering and timbering for conveyor mining.

Changes made in laws governing anthracite mining by the 1947 Pennsylvania legislature were summarized in a paper by Thomas M. Beaney, state mine inspector, Wyoming, Pa. Mr. Beaney's discussion was read by C. H. Curry, State Department of Mines. The new law authorizes the Secretary of Mines to promulgate rules and regulations for small mines employing five persons or fewer and to inspect them regularly; provides for weekly inspection of all accessible parts of an abandoned portion of a mine where gases have ever been found; requires that the mine foreman or his assistants make written reports of daily inspection of working

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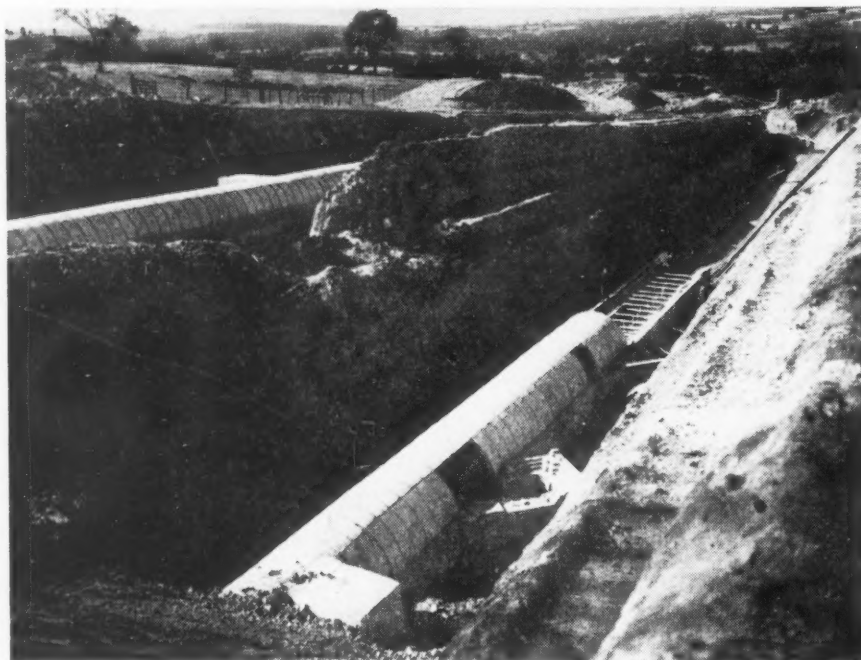
THE BIG DEMAND IS FOR TIGER BRAND

places and that these reports be securely bound; and forbids advance to within less than 100 ft. of inaccessible workings which are likely to contain a dangerous accumulation of water or gas without agreement among company officials, the mining engineer and the mine inspector upon the width of the approaching place or places and upon the point at which test holes must be started, the minimum penetration of such test holes to be 20 ft. in advance of the face.

Changes in the bituminous law in 1947 were surveyed by A. J. Nairn, state mine inspector, Punxsutawney, Pa., who explained new provisions covering ventilation, electricity, rock-busting, telephone communications, shaft cages, gassy mines, gasoline motors and mines employing fewer than five men. Following Mr. Nairn, C. H. Maize, state mine inspector, Gray, Pa., reviewed the new mine-sealing law passed by the 1947 state legislature (p. 128 of this issue).

Winding up the session Friday afternoon and closing the convention, a

six-man panel answered questions on auxiliary blowers with tubing in entry-driving and loading-machine operations, single-wire telephone lines, definitions of permissible equipment, absenteeism, electrical accidents, accidents from falls of roof and coal, "dry and dusty" mines, water supply for firefighting and dust abatement, signal systems for conveyor mining, safety on triple-shift operations, multiple shooting, first-aid training and other matters. The panel included George W. Grove, supervising engineer, Safety Division, U. S. Bureau of Mines, Pittsburgh, who was moderator, and the following experts: F. E. Griffith, coal mine inspector, U. S. Bureau of Mines, Pittsburgh; J. C. Metcalfe, state electrical inspector, Indiana, Pa.; M. Albert Evans, assistant to the vice president, Coal Division, Eastern Gas & Fuel Associates, Pittsburgh; J. L. Hamilton, manager, northern coal mines, Republic Steel Corp., Uniontown, Pa.; and L. D. Kimmel, state mine inspector, Indiana, Pa.



PORTAL under construction for the new Wentworth mine. One of a number of British mines being opened by the National Coal Board, this small operation, is expected to employ the latest in machinery and methods.

New British Mine Seeks To Match American Methods

From beneath the grave near the village of Wentworth, in which lies the headless skeleton of Thomas Wentworth, Earl of Strafford, executed for treason in the reign of Charles I, will soon flow coal from one of the new modern coal mines the National Coal Board is opening to relieve the fuel shortage, reports

John Love, business editor, *Cleveland Press*, following a recent visit to Great Britain.

A small mine and one of a number the board is rushing into production, the operation is planned to be a most efficient one. In a sense, it will be a demonstration mine, showing what can be done in England with

the favorable conditions of a 6-ft. level seam, the American room-and-pillar method instead of the British long-wall system and the use of mechanical loaders and electric haulage. Only 2 tons per man-shift is promised, but engineers believe that it will be approaching the American average of 4 to 5 tons before long.

Work of opening the drifts has been going forward with just about the speed a visitor would expect to find around an American project. At the time the accompanying illustration was taken, setting-up of the concrete tunnel sections was about completed and loading of the first coal was expected in late 1947.

Pillars are to be left because the coal board doesn't want to let the village down, but it also is the fastest way of taking out the coal.

There really is no special reason the British should try to get out every ton of coal in the ground—they have coal in sight for at least 200 years, according to engineers with the coal board, but the second century's coal will be harder to get at. Perhaps many more mines of this type and larger will be opened. The little Wentworth mine will cost the equivalent of \$150,000 and will return its investment in 18 months. In a few years it will remove 750,000 tons and then be worked out.

New British mines opened in thick seams, with good modern equipment and with miners not suspicious of the management—less likely, apparently, on new sites—and with no precedents to restrain production, are expected to approach the American averages.

Harold Saul, mining engineer and a district executive of the coal board in charge of the operations, had much trouble bringing together the equipment for the new Wentworth project. The concrete tunnel sections are those used in building the London subways. The rails came from the sidings of an abandoned mine. The pumps were used for fire fighting in London after the bombs broke the water mains. The surface buildings are concrete huts made for the Army. The locomotives came from a munitions plant, the fan from a munition factory. Delays that would have held up the work for another year were short-circuited in this manner. These delays alone explain why the British can't modernize at once in the manner Americans sometimes think they should.

Not far away, the United Kingdom's second "open-cast," or strip mine, was opened during the war. Many others have been opened in the district, some of them already exhausted. The clay and the topsoil are separately piled, and when the coal is removed, they are put back as they were. The ground yields a crop the first year and is claimed to be more workable afterward than before, with the yield as high as ever in a couple of years.

"The fate of the world sits on this rug"

- JOHN L. LEWIS

NOTE: Paste this editorial in your hat. Re-read it as you start to shiver the next time John L. Lewis cuts off the nation's coal supply.

"Labor monopoly" will mean much more to you then. But if you are worried enough you will get after your Congressman to do his part now—before the shivering starts.

★ ★ ★

"The fate of the world sits on this rug."

The men on the rug: John L. Lewis, President of the United Mine Workers, who made the remark; Benjamin Fairless, President, United States Steel Corporation; George M. Humphrey, Chairman, Pittsburgh Consolidation Coal Company; Harry M. Moses, President, H. C. Frick Coke Company; Charles O'Neill, President, United Eastern Coal Sales Corporation; the late John O'Leary, International Vice President of the United Mine Workers; and John Owens, President, District No. 6 United Mine Workers.

The place: Room 800, Carlton Hotel, Washington, D. C.

The time: Last July during the "negotiation" of a new soft coal contract.

The outcome: Another whopping increase in wages and the price of coal, another hike in the cost of living, and a "contract" which binds the United Mine Workers only as long as they are "willing and able to work."

Mr. Lewis was right. The fate of the world did sit on the rug. In fact, it sat at Mr. Lewis' feet, for, as this editorial will explain and as the outcome shows, his power over coal is absolute.

Without coal modern industrial civilization collapses. Without Mr. Lewis' assent coal can not be mined. He has the nation and, in the years 1947-48, the world at his mercy.

The Taft-Hartley Act, good as it is, does nothing to check this kind of monopoly.

I

The Taft-Hartley Act fails to protect the public in many major particulars.

Here are some of them.

1. Labor monopoly is promoted and protected by its continued exemption from the federal antitrust laws. Management has no such exemption and should not have.

2. Industry-wide bargaining, a kind of second-degree monopoly, is left virtually undisturbed. So is union-wide bargaining which extends the power of national unions far beyond a single industry.

3. Featherbedding, the art of getting paid for doing nothing, is left largely intact.

4. The menace of having local utility strikes wreck the health and safety of a community is left untouched. Postponement and persuasion are the only instruments provided to deal with strikes that would wreck the nation.

My purpose in citing these omissions from the Taft-Hartley Act is not to belittle the act or its framers. They did a most courageous and constructive job. They made a real start toward restoring a workable balance in industrial relations in the United States, so far as the law can do it. But they have not completed the job. Among their omissions the two discussed in the next sections of this editorial stand out above all others.

II

The most serious Taft-Hartley shortcoming is its failure to deal with labor monopoly.

Labor monopoly exists wherever a union is so strong that bargaining becomes a sham and the union virtually dictates its own terms.

If an employer or group of employers secures a monopoly or anything approaching a monopoly, prosecution for violation of the federal antitrust laws

is in order. That is as it should be, for monopoly means death to economic and political freedom.

But if a labor union secures complete monopoly control over an industry through control of its workers, that union remains above and beyond the antitrust laws. "The fate of the world sits on this rug." By that imperial attitude John L. Lewis fully demonstrated how obsolete is the notion that labor unions are weak and, therefore, need exemption from the antitrust laws. Through the United Mine Workers, Mr. Lewis controls about 90% of the coal miners. (No company controls more than 5% of the nation's coal output.) Wherever he sits he has at his feet the welfare of the whole nation.

Great international unions exercise a comparable measure of monopoly control in other basic industries—steel, transportation, and automobiles, for example.

These labor monopolies can destroy the nation if they are not themselves broken up. Witness the plight of France. There the Communists have found in the great labor monopolies an instrument for shaking the nation to its foundations.

III

The Taft-Hartley Act also leaves untouched industry-wide collective bargaining, which is a kind of second-degree monopoly.

When all or almost all of the employers in an industry get together with the union leaders to agree on wages and working conditions (that is called industry-wide bargaining) they set up a monopoly control. It is a less concentrated monopoly than when the terms are dictated by either side, as Lewis dictates them in coal. But, nonetheless, competition is eliminated and monopoly control is established over wages, which are by far the largest element in the cost of production. It follows that public regulation of collective bargaining—which means the end of free unions and free management—is not far behind.

Some employers defend industry-wide bargaining as their only defense against industry-wide unions. Other employers like it because it makes wages and hours uniform for their whole industry.

For those employers who are forced into industry-wide bargaining in self-defense the road to relief is clear. Congress owes it to them and to the public to free them from the necessity of dealing with a monopolistic union. The best way to do that is to remove the exemption of labor unions from the federal antitrust laws.

To those employers who engage in industry-wide bargaining because they like it the proper answer is also quite clear. They (and the union involved) are maintaining a private monopoly which is offensive to the public interest. It should be prevented by law.

IV

Congress should finish the job of eliminating labor monopoly and industry-wide bargaining.

In the course of enacting the Taft-Hartley law last spring the House acted to eliminate the exemption of unions from the federal antitrust laws and to make industry-wide bargaining illegal. The Senate, however, refused to go along.

The principal reason advanced in the Senate for deferring action was that more knowledge is required to legislate intelligently. To get the needed information, a joint Congressional committee was created.

It is standard Congressional practice to stall off tackling a difficult job by creating a special committee to study it. The new joint committee is not likely to prove an exception to this rule—*unless the voters loudly demand of Congress that it get on with its job of protecting the public interest in the conduct of labor relations—a job which is nowhere near done.*

Helpful and effective as many of its provisions are, the Taft-Hartley Act does not face squarely the central principle of industrial relations in a free society. That principle is this: *Neither employers nor organized workers, separately or in combination, shall exploit the public by establishing a monopoly.*

Do not let your Congressmen go to sleep on the job of solving that problem or hide from it because of fear. The perfect solution may be hard to find. But the problem can be largely solved by making organized labor subject to the federal antitrust laws just as management is now subject to them. If that problem goes by default your children and your grandchildren will really know what slave labor means.



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Coal-Mining Problems Sifted At West Virginia Meeting

FIRE FIGHTING and fire prevention, cooperative medical care, mining community health, time-studies in mechanical mining, treated timber, mine safety, preparation, labor relations and management were the themes of the 40th annual meeting of the West Virginia Coal Mining Institute held jointly with the 1947 fall meeting of the Central Appalachian Section, A.I.M.E., at the Daniel Boone Hotel, Charleston, W. Va., Dec. 12 and 13.

In addition to the regular program, the joint meeting featured a luncheon address by Carroll B. Huntress, New York, president, Association Opposed to the St. Lawrence Canal, J. A. Hagy, superintendent of mines, Jewell Ridge Coal Corp., Jewell Ridge, Va., presiding, and an annual dinner tendered by the Kanawha Valley Mining Institute, with Harry L. Gandy, assistant to the president, Elk River Coal & Lumber Co., Widen, W. Va., as the speaker of the evening, J. J. Foster, general manager, Island Creek Coal Co., Holden, W. Va. presiding. Mr. Huntress analyzed the attempts made in the past and being made now to put over the St. Lawrence project and detailed the counter measures being taken by the coal-mining industry and allied organizations. The problem, he stated, is still not solved, in spite of the defeats administered the project's advocates in the past. But its opponents are still ahead and, by continuing and intensifying their efforts, can halt this particular move toward national socialism.

Taking as his theme "Where Point the Guideposts?" Mr. Gandy sketched the benefits of mechanical mining to the coal-mining industry, as well as the new problems in mining and preparation it has brought in its wake. But its advantages have outweighed the problems and the guidepost indicates further improvements in equipment and greater use. Coal has progressed in the fields of safety and welfare and will continue to go forward, Mr. Gandy declared. Coal demand will continue strong in the years ahead and the industry will forge ahead in raising efficiency and product quality and in improving its service to its users. A major expansion is ahead in non-fuel uses.

In the field of relations between employer and employee, said Mr. Gandy, monopolistic union practices need and will be curbed to protect individual rights and the general welfare. The guidepost points to more recognition of the rights of others and some regulation of the right to strike. The country and the world can progress only through higher efficiency and greater productivity. Human rights must be safeguarded

against attacks now worldwide, and those rights include the right to acquire and hold property. The guidepost points to a greater realization of the fundamental nature of property rights and to a realization that work and efficiency are the keys to a better living. Government grabs for power must be met by fostering individual acceptance of the responsibilities of citizenship.

We are now, Mr. Gandy continued, living in the best age for opportunities the world has ever known, in spite of the many difficulties being encountered. Declaring that the nation is responding to the calls for help from other parts of the world, he expressed the opinion that if these difficulties and uncertainties can be surmounted, the world will enter a new era of fuller and better understanding. The result will be real peace and America, which proved itself able to work hard and endure for victory, should work equally hard for peace through better international understanding and cooperation.

New developments in underground fire-fighting equipment (December, 1947, *Coal Age*, p. 128) was the subject of the first address at the opening session, by Fred J. Bailey, safety director, Cardox Corp., Chicago, with W. E. E. Koepler, secretary, Pocahontas Operators' Association, Bluefield, W. Va., as chairman. Fire prevention around coal mines was the subject of a companion paper by D. S. Butler, West Virginia State Insurance Commissioner, Charleston.

Declaring that the fire-loss record of the industry has not been good and is resulting in increasing difficulty in placing insurance, Mr. Butler detailed some of the difficulties encountered in keeping losses down by decreasing the number of fires. The answer is constant education and everlasting alertness. Some of the practical steps that can be taken, he declared, include the following:

1. Delegation of the responsibility for preventive work to some one person.
2. Analysis of the possible causes of losses and then taking the necessary steps to eliminate, reduce and control these causes without impairing production.

Major causes of fires around coal-mining properties are cutting and welding, defective electrical wiring, faulty heating installations, careless smoking practices and excessive accumulations of oil in coal spraying and on the floors of oil houses, substations, fan houses and shops.

Regular inspection is a major element in reducing fires. Another is knowledge of the types and uses of

fire-fighting equipment. A third is an organization and a plan for coping with any fires that do occur. A fourth is training in fire fighting. A fifth is a good water supply. A sixth is proper design and location of buildings and surface structures, which also is helpful in reducing insurance rates.

Recommending the establishment of fire districts in coal-producing areas, Mr. Butler summed up by stating that "An effective fire-prevention program requires assignment of definite responsibility, a painstaking and thorough analysis of the possible causes of loss, effective steps to reduce, eliminate or control the hazards of fire and, finally, the co-operative effort of operator, insurance agent or broker, insurance companies and public officials."

Offering a factual discussion of co-operative community medical service, Dr. W. V. Wilkerson, Prenter, W. Va., based his remarks on over 17½ years in contract medical practice—five years as chief of the medical section of a southern West Virginia hospital and the remaining years as a community physician. Summarizing his findings, Dr. Wilkerson declared that "contract, list or cooperative medical practice offers to the miner better service, more certain assurance of service, a reasonable cost and professional equipment standards that compare favorably with medical service available in other communities of similar size and situation. Most criticism comes from professional agitators and others who have not personally experienced the advantages of cooperative medical service, rather than from the rank-and-file workers who are the backbone of the program."

Workers, said Dr. Wilkerson, are not deprived of their free choice of a physician, while the contract physician must of necessity provide service to everybody at all times on an equal basis, whereas another can refuse if he so desires. Cost usually is less, while the average contract doctor generally is at least the professional equal of his confrere in private practice. His office equipment also is as good and many times much better. However, Dr. Wilkerson concluded, "let it not be understood that we are blind to the defects of contract practice, for 17 years of such practice has shown us the whole picture. But in spite of admitted defects and imperfections, it is our sincere belief that it is the most practical set-up available in the service required by a local community and furnished by the community physician."

Taking the subject farther to the question of mining community health, Dr. E. Lyle Gage, president, Mercer County Medical Society, Bluefield, W. Va., quoted a section from the foreword to the Boone report to the effect that "any assertions which may have been made that inferior standards are general in the coal in-

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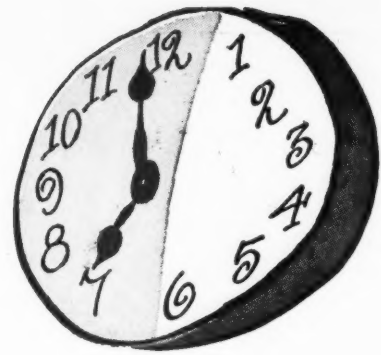
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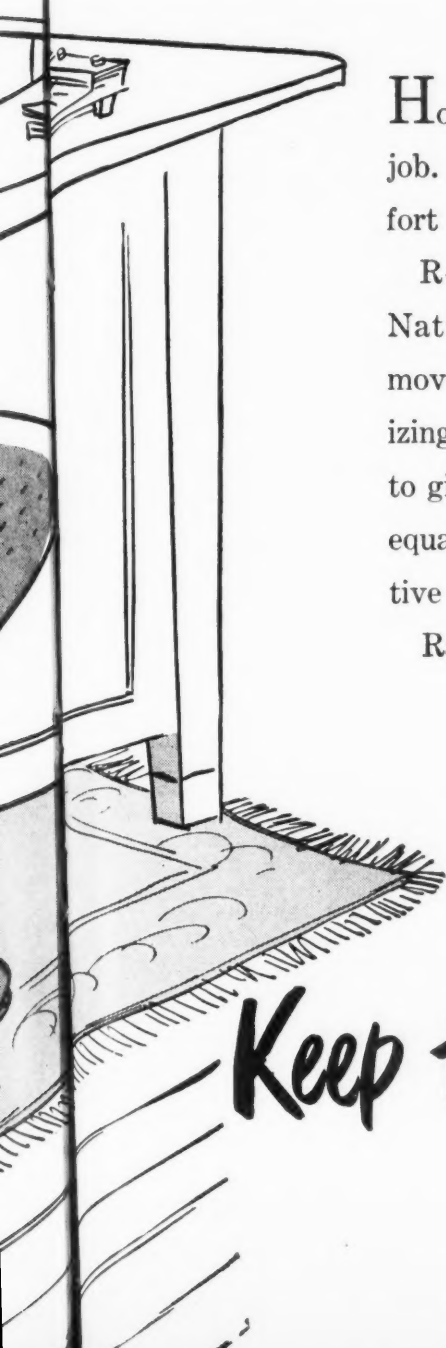
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dustry are disputed by the survey. Definitely low standards of health are readily apparent in certain places, but not in all areas where coal is mined. Provisions for health range from excellent, on a par with America's most progressive communities, to very poor."

Tracing the growth of miners' hospitals and of facilities for medical care, Dr. Gage concluded that service is now generally available that compares favorably in quality as well as cost with that available elsewhere. Furthermore, steady progress still is being made. But, he declared, "There are two factors influencing the health of the mining community that have been neglected by the operators, the miners and the medical profession." These are: (1) local sanitation and hygiene and (2) recreational facilities.

"The lines of patients at the local doctor's offices could be shortened perceptibly by a few visiting nurses and some public-health accomplishments in each community. The fault—much of it—is ours as a medical profession; also, a great deal of it is the result of false economy on the part of the operators, the miners and the taxpayers in general.

"Other industries have come to realize that an all-out program of health and recreation pays dividends in increased production. In my opinion, such eventually will be proved the case in the coal-mining community. Such a program should be the responsibility of all concerned and not of any one part of the industry, for only by cooperation throughout can a community reach its best. With an active recreational program, well supervised, I am sure there would be less need for hospital beds in the mining community." Along these lines the Boone report emphasized the need for leadership in the ranks of union leaders, as well as in the ranks of management.

Included in points brought out in discussion was a statement that conferences between medical men and management can result in a significant improvement in health and hygiene in underground operation, and a declaration that operators should be alert to developments in the general fields of medical service and community health because there is a prospect of trouble ahead.

With Charles E. Lawall, engineer of coal properties, Chesapeake & Ohio Ry., Huntington, W. Va., presiding, the second technical session opened with a discussion of time-studies in mechanical mining by P. R. Paulick, consulting engineer, Library, Pa. "It has been definitely proved," said Mr. Paulick, "that one of the best ways to obtain profitable results is to establish a definite goal of attainment for men and machines. And for the purpose of determining this goal there is no better method than by time-studies, by which definite, accurate

W. Va.-A.I.M.E. Officers

R. H. Morris, vice president, Gauley Mountain Coal Co., Ansted, W. Va., was elected president of the West Virginia Coal Mining Institute at the 40th annual meeting. He succeeds J. J. Foster, general manager, Island Creek Coal Co., Holden, W. Va. Other officers were chosen as follows: Vice Presidents—Jesse Redyard, Redyard Coal Co.; Geo. R. Higinbotham, Consolidation Coal Co. (W. Va.); William Beury, Algoma Coal & Coke Co.; James F. Trotter, Davis-Wilson Coal Co.; and C. R. Bourland, The New River Co.

Executive Board—W. G. Crichton, Johnstown Coal & Coke Co.; T. E. Johnson, Northern West Virginia Coal Operators' Association; John T. Sydnor, Rail & River Coal Co.; L. E. Tierney Jr., Eastern Coal Corp.; and J. J. Foster.

Secretary-Treasurer — Charles T. Holland, School of Mines, West Virginia University, Morgantown, W. Va.

Charles E. Lawall, engineer of coal properties, Chesapeake & Ohio Ry., Huntington, W. Va., was elected chairman of the Central Appalachian Section, A.I.M.E., succeeding James A. Hagy, superintendent of mines, Jewell Ridge Coal Corp., Jewell Ridge, Va. Other officers were chosen as follows:

Vice chairmen—L. W. Huber, Mine Safety Appliances Co.; R. H. Allen, Well Service Co., and A. R. Matthews, Clinchfield Coal Corp.

Executive committeemen — J. T. Parker, Inland Steel Co., and B. H. Mott, Mott Core Drilling Co.

Secretary-Treasurer — Charles T. Holland.

standard production capacities of men and machines are established. Time-studies also are used to analyze and correct faulty or inefficient operating practices, determine and establish the one best way of doing a job, eliminate delays, etc. The standard production capacities set up from time-studies are used to compare actual results obtained, either daily or monthly, and the efficiency rating given each unit. High production per man and machine and low unit cost are dependent upon the intelligent use of a definite task as a measure of a day's work and not upon the time spent on the job by workman or machine."

High cost per ton usually can be traced to three principal causes, all susceptible to time-study analysis and correction:

1. Failure to use the mine area effectively, lack of concentration and failure to use equipment and labor to its full capacity.

2. Unnecessary delays, waits, interruptions, insufficient labor, tools,

supplies, etc., lack of proper mechanization equipment and poorly planned mining system.

3. Excessive and unbalanced supply inventories.

Outlining the qualifications of a time-study man, Mr. Paulick then pointed out that a survey breaks down into three separate operations:

1. Preliminary survey to get familiar with the operation and pick up the outstanding faults.

2. Actual breakdown of the work into its component parts and analysis of each with a stop watch.

3. Summary of the time-study in the office and the setting up of unit standard times, culminating in setting of the over-all standard time for the particular job.

Use of timber treated by the Osmose process at the Point Lick mine, Hatfield-Campbell Creek Coal Co., Rensford, W. Va., was the subject of a paper presented by Paul Hamer, superintendent. Growing use of timber requirements and increasing cost of both the timber itself and also labor resulted in a decision in the middle 30's to treat timber. After investigation of other processes the company finally decided in 1939 "to utilize the Osmose method of timber treating. The simplicity and low cost of the process were impressive. The Osmose application was at that time confined to green timber, which was a further advantage. It was ideal for a mining company securing timber locally or operating its own sawmill. Cost of setting up an Osmose treating program at the mine was negligible, as no specialized equipment was necessary."

Two steel dipping tanks—one for ties and one for longer timbers—are used at Point Lick. They are mounted on skids so they can be moved to any part of the mine yard to facilitate handling and stacking. Timber to be treated is prepared by square sawing or peeling. "Slabbed timber has been successfully treated recently by the Osmose process." Two men dip the timbers, which drain about a minute and then are stacked, covered with paper and sealed to permit deep penetration of the treatment. As a result of wartime shortages of labor and timber, dipped timbers, normally cured for 30 days, were taken underground immediately. It was found that the osmotic diffusion of the treating salts continued indefinitely. However, because the mine air is dryer in winter, "stacking underground" is best done in summer and outside stacking still is recommended by the manufacturer.

Some 500,000 bd. ft. of timber is treated annually, said Mr. Hamer, and, based on 1947 prices for green timber, treating salts and labor and comparative lives of three years for untreated and 12 years for treated wood, the saving is \$20.98 per thousand board feet per year.

"The use of treated timber should

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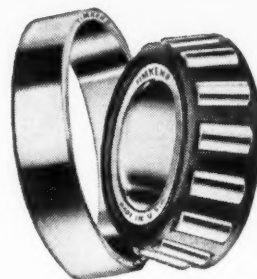


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not be indiscriminate," Mr. Hamer concluded. "Only the 'permanent' sections of the mine, such as main haulways and airways, need be protected with treated timber. In the Point Lick mine untreated timber must be replaced in 2 to 3 years, whereas Osmose-treated timber is still sound after eight years."

Announcing a drive to reduce haulage accidents in West Virginia, which account for 29.4 percent of all fatalities, although the percentage of men engaged in such work is much less, Arch J. Alexander, chief, West Virginia Department of Mines, Charleston, W. Va., stressed the human factor in a paper read by R. F. Overly, superintendent, Christian Colliery Co., Mahan, W. Va. Bad human habits and bad working practices are involved in about 75 percent of all accidents, Mr. Alexander declared. Correction of such habits and practices is the next major forward step in safety. It involves appealing directly to the miner, intensive education and enlistment of his cooperation. Good safety education, coupled with good supervision, will attain the greater safety that is necessary to continuation of the industry as a free enterprise.

"Coal companies and machinery manufacturers have been searching far and wide for some trick process with which to wash coal, while the best answer," said Byron M. Bird, Jeffrey Mfg. Co., Columbus, Ohio, "appears to lie in the commonest of all types of washers—the Baum jig. Why add sand or magnesite, or some other material, to a coal to form a heavy medium when a natural medium-forming material of fundamentally better characteristics is to be found in every coal?"

The new method, said Mr. Bird, is now in use in six washeries. The first installation was made in 1942. "Data on four of the plants show a recovery at least equalling that shown possible by the float-and-sink data on the raw coal.

"The method involves two essential features:

"1. The circulation of a bone medium about $\frac{1}{8} \times 0$ in. This fills the interstitial spaces in the jig bed and in this way the jig, in effect, is converted into a float-and-sink machine.

"2. The use of a type of jig stroke such that the entire separation takes place on the back, or suction, stroke. This type of stroke holds the medium in the bed and prevents the jig from washing it over with the coal."

The medium, said Mr. Bird, is obtained by screening and crushing the product of the last refuse elevator, feeding the $\frac{1}{8} \times 0$ fines to the washer. All that is necessary is for the operator to see that plenty of medium goes into the jig as it automatically rejects the excess through operation of the float in No. 1 compartment.

"The jig medium appears to act over the entire size range. For instance, the cleaning of the 48x100-

mesh sizes is greatly improved by its use." In addition, "all sizes of coal tend to be washed at one specific gravity," since the falling medium resulting from back-stroke operation has no sizing action. The crushing circuit becomes of great importance in liberating coal. "Seemingly, any difficulty of separation can be handled."

"Disputes and grievances between operator and employee are as varied as they are numerous," declared Van B. Stith, general superintendent, Anchor Coal Co., Highcoal, W. Va., in opening the concluding technical session with L. I. Cothorn, head, Department of Mining Engineering, Virginia Polytechnic Institute, Blacksburg, Va., presiding. Such grievances and disputes have three general sources:

1. Differences between an employee and his foreman.
2. Industry-wide adjustments and working contracts.
3. Off-the-job disputes.

"Any intimation on the part of any employee that he is dissatisfied with his conditions or treatment warrants investigation at once," said Mr. Stith. "A frequent adjustment of small things is better than a grand adjustment of many complaints. And, in any event, the grand adjustment most times comes too late.

"The coal operator is in business to make money. To make money he must produce coal, not labor disputes. Each labor dispute curtails production. The degree of curtailment is in direct ratio to the seriousness of the dispute. Therefore, it behooves management to handle labor differences and disputes promptly and properly as they arise."

A rigid pre-employment investigation, Mr. Stith asserted, is essential in reducing disputes. All disputes should have prompt and undivided attention, and sufficient time should be taken to make sure that the action decided on is right. One person should have the final word in discharges. Wage rates should never be tampered with at the mine and timekeeping should be accurate as possible and set up so that the employee gets the figures each day and can proceed promptly to get errors rectified. Local agreements usually result in major troubles and should be avoided. In dealing with labor, "first convince yourself that your employees are human individuals just the same as you, with much the same tastes, aspirations and aims. Most of them will go along just about as you would have them go if the course is pointed out to them in a fair and square manner." Work closely with the operators' associations in settling disputes, thereby getting the benefits of other experience.

Concluding his paper, Mr. Stith offered the following basic suggestions:

- "1. Obtain a thorough knowledge of

your working contract and then adhere to it.

"2. Work very closely with your operators' associations.

"3. In dealing with labor, be fair, truthful, honest and firm in your decisions.

"4. Do not make promises. If you have something to pass out to an employee, wait until you are ready and then give it to him.

"5. Handle disputes promptly.

"6. Do not be impulsive in your decisions.

"7. Devote much time to your employment and discharge systems.

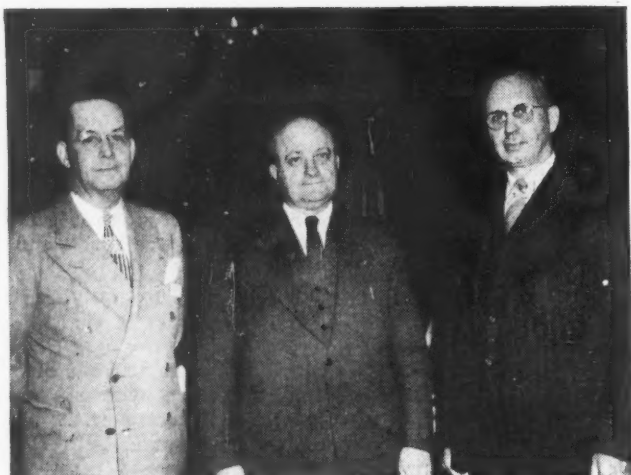
"8. Make every effort to settle all disputes at the mines and with the miners."

Discussion following Mr. Stith's address emphasized the importance of settling disputes promptly and at the mine—in fact, at the face, one speaker insisted. A management committee, corresponding with and meeting with the pit committee, was described as having good results at one group of mines. A number of work stoppages also have occurred because the union has shoved aside grievances as management frequently is accused of doing. Discussion also stressed the importance of selling the miner on the need for reasonableness and cooperation with management, as well as the even-greater importance of getting back to a personal basis of relationship.

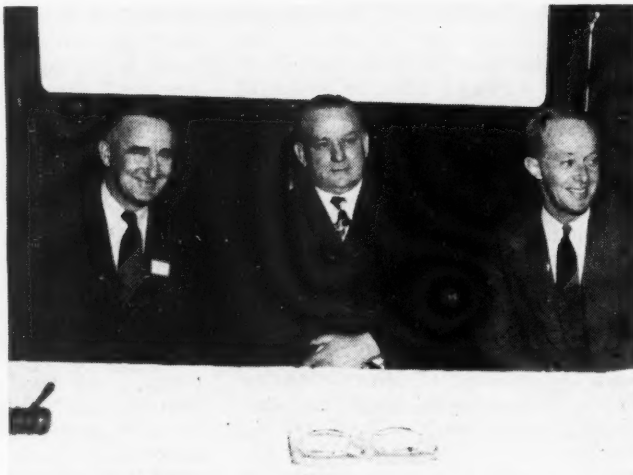
"Management," declared Ivan A. Given, editor, *Coal Age*, "is the art of getting things done faster, better and with less labor." Two of the main things management has to do with are (1) machinery and materials and (2) men. In the field of machinery and materials, one of management's jobs is to keep track of developments and buy and install machines and materials when study shows they will save money. A second managerial job is to make sure that equipment, after it is installed, is operated at as near capacity as possible.

Humanity and common sense are the major ingredients in good relations between management and men. Incentives, said Mr. Given, are powerful managerial tools. Expressing his opinion that coal, because it still is converting to mechanical operation and consequently has not exhausted possibilities in raising efficiency, is not ready for cash incentives of the usual type, Mr. Given pointed out that incentives are good equipment and good working conditions, stimulation of competition between crews and mines, and the giving of recognition for jobs well done.

In conclusion, said Mr. Given, raising the standard of living requires increasing the supply of goods and services made available at the same or a lower cost. In other words, the key is increased efficiency. The manager's greatest opportunity lies in that direction.



SPEAKERS at the opening meeting of the Kentucky Mining Institute, Friday afternoon, were: H. C. Moore (left), president, Kentucky Coal Agency, Madisonville; J. L. Patten, director, Mayo State Vocational School, Paintsville; and F. J. Forsyth, electrical engineer, Kentucky Department of Mines, Pikeville.



SPEAKERS and chairman at the Saturday afternoon session: Paul M. Jones (left), chairman, civil and mining engineer, Jones & Donan, Madisonville; George N. McLennan, superintendent, Isabella (Pa.) mine, Weirton Coal Co.; and G. Moss Patterson, district manager, Cardox Corp., Evansville, Ind.



INSTITUTE OFFICERS and Saturday morning speakers—Seated: A. D. Sisk (left), secretary-treasurer, V. D. Picklesimer, president-elect, and Louis W. Huber, chairman of the program committee. Standing: George Keat (left), construction engineer, Consolidation Coal Co. (Ky.), Jenkins; Dan Harrington, chief, Health and Safety Branch, U. S. Bureau of Mines; and James L. Elder, chemical engineer, U. S. Bureau of Mines.

Wide Range of Mining Subjects Features Kentucky Meeting

COAL UTILIZATION, grounding of underground electrical equipment and other safety measures, mining education, new portal facilities and coal-breaking equipment and methods were among the topics discussed at the annual meeting of the Kentucky Mining Institute, Lafayette and Phoenix hotels, Lexington, Ky., Dec. 12-13.

H. C. Moore, president, Kentucky Coal Agency, Madisonville, was toastmaster at the annual dinner, at which the Rockwell Kent painting, "Baker

of the Bread of Abundance," was presented to the University of Kentucky by Grover H. Creech, associated with the Creech Coal Co. and Randall Fuel Co., in behalf of the Bituminous Coal Institute. Leo M. Chamberlin, vice president of the university, accepted and passed it on to C. S. Crouse, head of the Department of Mining & Metallurgical Engineering.

Honorary memberships in the institute were conferred on Dan Harrington, chief, Health & Safety

Branch, U. S. Bureau of Mines; G. T. Powell, U. S. Bureau of Mines, Norton, Va.; John E. Jones, safety engineer, Old Ben Coal Corp., and J. B. Allen, retired, former secretary of the Kentucky River Mining Institute. Printing of a second edition of 5,000 copies of the "Coal Mining Reference Book" was approved, since the initial 5,000 printed has been practically exhausted. A new committee headed by A. D. Sisk, institute secretary-treasurer, was authorized to revise the book for this second edition.

"In the not too distant future," said H. C. Moore at the opening technical session, "coal will be mined and produced as one of our precious minerals." Presenting a paper on the importance of the coal industry in Kentucky, he outlined the many trends that point to increasing demands for coal. The United States, he contended, should start now to develop large-scale facilities for making liquid fuels from solid fuels. Nothing in the future, in his opinion, will displace coal in the large steam-generating plants in our cities. The heat pump, if it grows in use, also will increase the demand for coal. In Kentucky in 1946, approximately 55,000 men were employed in the mining of over 69,000,000 tons.

Grounding of underground electrical equipment precipitated the usual animated discussion. F. J. Forsyth, electrical engineer, Kentucky Department of Mines, presented a brief paper reviewing the background of the subject, pointed out that a good ground is one of less than 10 ohms and then offered some new findings and opinions. He recently made a number of measurements of the ground resistance of men working in the mines in ordinary footwear. These ranged from a few thousand to several million ohms. Since resistance must be about 40,000 ohms or lower to cause a man to be electrocuted on 250-volt circuits, he

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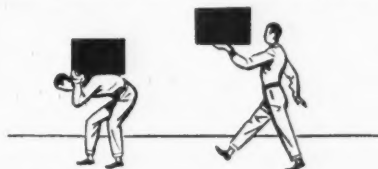
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***BONUS:** "Something given in addition to what is usual or strictly due."—Webster's Dictionary.

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THE PAINTING, "Baker of the Bread Abundance," was presented on behalf of BCI by Grover H. Creech (left), Creech Coal Co. and Randall Fuel Co., and was accepted for the University of Kentucky by Leo M. Chamberlin (right), its vice president.



COAL ASSOCIATION secretaries from the four mining sections of Eastern Kentucky attending the meeting included: George S. Ward (left), Harlan, Joseph J. Ardigo, Williamson, H. S. Homan, Big-Sandy Elkhorn, and A. E. Silcott, Hazard.

suggested that truly insulating footwear and gloves would increase safety. He found that some mining machines resting on dry coal have about 100,000 ohms resistance to ground while men working with those machines usually have ground resistances of that much or greater.

The Kentucky Department has been experimenting with neon indicating lights as a substitute for solid grounding on shortwall mining machines and the results have been favorable. Simplicity is the advantage but it is too soon to draw any conclusions. Two objections to solid frame grounding were cited by Mr. Forsyth: (1) it gives the operators a false sense of security which may cause them to become careless; (2) it can be the cause of dangerous arcs at the face. With respect to the latter, he called attention to the fact that track-mounted equipment, which is grounded naturally, has never been isolated as a menace from the arcing standpoint.

Electrocutions from machines with ungrounded frames are a minor menace, according to the results of a case-by-case study of the records of 100 electrocutions in Kentucky coal mines over a 13-year period. Only two can be attributed to ungrounded frames, the same as the number attributed to 110-volt lines. None are attributed to rubber-tired shuttle cars. All the 100 electrocutions, Mr. Forsyth contended, could have been prevented by insulating footwear, gloves and so on.

What he considers an increased hazard by frame grounding was reported by George Leatherman, electrical engineer, Inland Steel Co., Wheelwright. In line with a willingness to do anything recommended to increase safety, solid grounding was adopted. A maintenance difficulty caused a drill to be charged to full line voltage. When a control wire accidentally grounded to a machine frame it was fortunate it was not one which could

have started the machine and perhaps caught a man setting bits. He agreed with Mr. Forsyth that insulating gloves and shoes are a good answer to the problem. Mr. Leatherman believed it unreasonable to argue for solid grounding because of the electrical code. Mining equipment was not considered when it was formed and even that code does not call for grounding of portable electrical appliances.

Thomas R. Weichel, electrical engineer, U. S. Bureau of Mines, Mt. Hope, W. Va., said that grounding has eliminated sparking from frames of machines to the coal face and between frames of face machines, both important advantages in gaseous workings. Insulating clothing, he contended, cannot, in a practical manner, provide complete protection in low, wet mines. Proper circuit protection was his solution for most of the objections raised against solid grounding.

Walter Hornsby, assistant chief, Department of Mines & Minerals, Kentucky, said that solid grounding definitely puts the weakest point at the face where arcs are the greatest hazard. He mentioned a fatality with a portable coal drill having a ground wire which caused full line potential to be put on the frame when there was some disarrangement of the cable connections or equipment.

The fact that the combustible content of a cable is approximately doubled by adding a ground wire was given as another objection. Because falls of roof and coal are the greatest causes of accidents, Mr. Hornsby doubted the wisdom, at this time, of demanding that the management divert its attention to a complete revision of the cable and grounding system.

Lee Sinnif, electrical engineer, Consolidation Coal Co. (Ky.), Jenkins, said that in the light of his considerable experience with 550 volts, workmen of experience demand that such equipment have safety grounds. There

is no excuse, he contended, for not having proper fuse connections in nips; also the same care must be devoted to maintaining ground wires as to maintaining the positive and negative power wires.

A three-part "total program" for mining education of high-school students was presented by J. L. Patten, director, Mayo State Vocational School, Paintsville, Ky., as follows:

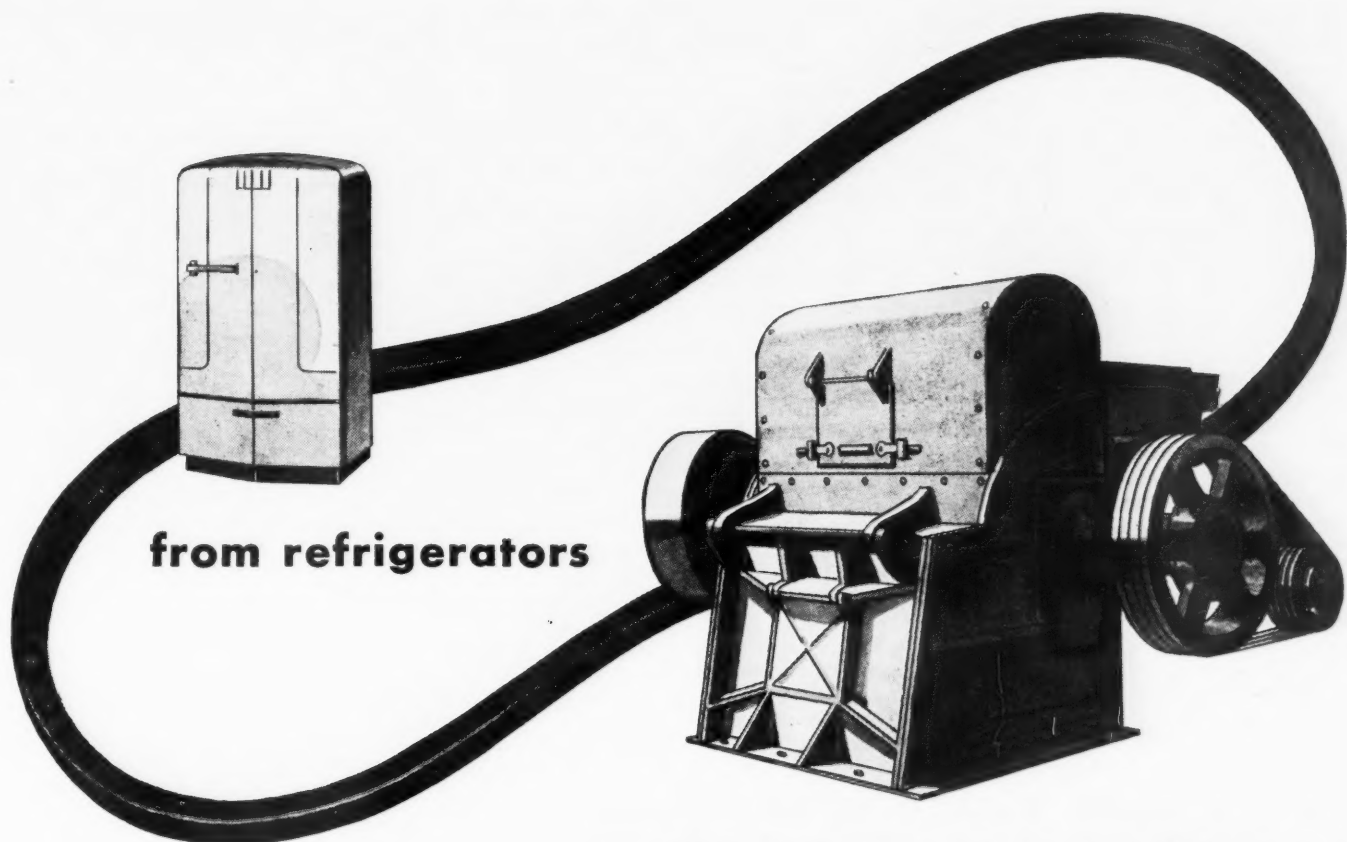
1. Adjusting the regular curriculums of the smaller high schools to include something on the mining industry. In geometry, for example, let the student apply it to mine tracks, and in the treatment of natural resources, emphasize coal.

2. For the larger high school—say 500 students or more—spend the \$60,000 to \$100,000 or more necessary to fit out a machine shop, equip it for demonstrating mine installations and so on so that specific courses can be adequately taught to those interested.

3. Establishment of trade schools which give high-school graduates the opportunity to learn a trade and the high-school drop-outs an opportunity to develop mechanical skills. The Mayo school is in this class. Cooperation with high-school authorities is obtained by accepting no students unless they have a recommendation from those authorities.

Mr. Patten emphasized the necessity of selling the school men on the program so as to have complete unity. Men in the coal industry should first agree on what constitutes a proper program—some want to emphasize engineering and others something else. For training in the large high school, he sees the possibilities of using buses to bring high-school students in from their smaller schools to attend special classes several times a week at the larger central high-school.

That coal plants and local living conditions should be made more attractive so that young men will want



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to work in the mines and thus create a public demand for the high-school-level training was the thought left with the institute by S. M. Cassidy, president, Consolidation Coal Co. (Ky.). He observed that most young men try to find something besides mining and then drift back to the community.

Arthur Bradbury, safety engineer, Inland Steel Co., Wheelwright, suggested that the high-school senior day, as held last year at the Mayo school, be extended to other sections of the state and even be adopted by the industry all over the United States. On that day, at Paintsville, Ky., the senior high-school students from four counties heard informed speakers and men of national reputation talk on everything from geology to the uses of coal and learned of the opportunities in the coal-mining industry. V. D. Picklesimer, general superintendent, South-East Coal Co., Seco, added that this senior day, inaugurated last year, is one of the finest things ever installed in the coal industry.

Savings of man-hours will pay back the total cost of the extensive development and construction of a new portal at Mine No. 204, Consolidation Coal Co. (Ky.), Jenkins, in a little over a year, said George Keat, construction engineer, in a slide-illustrated talk. Life expectancy of the mine is but ten years. Consequently, to meet the requirements of high salvageability and speedy low-cost construction with materials quickly available, Quonset-type construction was selected for the buildings housing bathhouse, lamphouse and other facilities for 550 men.

Emphasis was placed on ventilation, cleanliness, comfort and safety. Although the portal will have a short life, initial investment was not spared to insure low maintenance, which spells greater economy over the period. Through reduced travel time, the mine maintained the same production as before the shortened work day.

Experiments in underground gasification of coal at Gorgas, Ala. (*Coal Age*, May, 1947, p. 74), pointed to the following conclusions, said James L. Elder, chemical engineer, U. S. Bureau of Mines: (1) there is no difficulty in maintaining combustion underground, (2) coal in place can be completely consumed or gasified, (3) the high temperatures bring changes in the roof rock, causing it to become plastic and expand, thus filling the burned area without much subsidence and serving to keep the flow of the air and gas along the coal face, (4) it appears possible to produce a useful gas by underground gasification.

"Coal mining has not done so badly," said Dan Harrington, chief, Health and Safety Branch, U. S. Bureau of Mines, in a paper on "Safety Progress in the Coal Industry," parts of which he read at the meeting. In the period from 1911, when the U. S. Bureau was organized, to date, coal

New K.M.I. Officers

President—V. D. Picklesimer, general superintendent, South-East Coal Co. Mr. Picklesimer succeeded O. W. Evans, general superintendent of mines, fuel department, Norfolk & Western Ry.

Vice Presidents—C. B. Burchfield, general manager, Black Star Coal Corp.; Bradley Sparks, vice president and general manager, Luzerne-Graham Mining Co.; and W. F. Haydon, general superintendent, Hardy-Burlingham Mining Co.

Secretary-Treasurer, A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Operators' Association.

mining has reduced its fatality rate 41.6 percent, as compared to a reduction of only 16.4 percent for all of the people of the United States. During World War II, when the pressure to produce coal was enormous, deaths per million tons were 2.04, as compared to 3.91 during World War I. That represented a saving of 5,314 lives. But, he said, accidents in coal mining can still be reduced 50 to 60 percent.

Prevention of "dust disease" in mining is a problem he said should and can be solved. He contended that it is a combination of dusts that kills people and not one single dust. Breathing large quantities of any finely divided dust over long periods is injurious to health, he declared.

Use of the walking or working flame of the flame-safety lamp by mine operating officials, machine operators and others in testing for methane was advocated by George N. McLellan, superintendent, Isabella Mine, Weirton Coal Co., Isabella, Pa., in a discussion of high- vs. low-flame testing.

COAL AGE was founded in 1911 by the Hill Publishing Co. In 1915 COLLIERY ENGINEER, with which MINES AND MINERALS previously had been consolidated, was absorbed by COAL AGE.

When, in 1917, the Hill Publishing Co. and the McGraw Publishing Co. were consolidated to form the present McGraw-Hill Publishing Co., COAL AGE became a member of this larger publishing enterprise. On July 1, 1927, the journal was changed from a weekly to a monthly.

During 36 years the editorship has been held successively by Floyd W. Parsons, R. Dawson Hall, C. E. Leshner, John M. Carmody, Sydney A. Hale and Ivan A. Given. The editorial staff of COAL AGE consists of: Ivan A. Given, J. H. Edwards, Ralph R. Richart, William H. McNeal and W. A. Stanbury Jr.

Determining the absence or presence of gas is more important than estimating the percentage, and he contended that the high flame is better suited all around.

Always being hot, the lamp is sensitive to methane. One percent of methane lengthens the flame quite noticeably and 2½ percent runs it clear to the top of the glass. While some claim they can detect ½ percent of methane with the short flame, Mr. McLellan contended that most safety men cannot detect 1 percent by that method. The long flame does not put the man in darkness, making it difficult to see bad top; also it eliminates the risk of the flame going out.

Some 35,000,000 tons of coal have been broken down by Airdox, said G. Moss Patterson, district manager, Cardox Corp., Evansville, Ind., in a paper also describing the new Cardox mine-fire car (*Coal Age*, December, 1947, p. 127). Safety, reduced degradation and larger percentage of lump are the advantages of Airdox, Mr. Patterson stated. Air at 10,000 lb. per square inch from compressors on the surface is taken into the mines through steel lines, tested to 20,000 lb., to within 100 ft. of the face, from which point it is conducted through flexible copper tubing to the steel tube inserted in the drillhole.

Reporting on the first eleven months of 1947, Harry Thomas, chief, Kentucky Department of Mines and Minerals, said that three explosions had occurred, with two fatalities resulting. Two of these explosions were from improper handling of powder—one from black powder and the other from permissible. Although there is not now a single sealed mine fire in the state, eleven fires occurred. Seven were caused by arcs and grounds in electrical equipment.

Sixty-eight percent of the 121 coal-mine fatalities in the state were caused by falls of roof and coal. At railroad mines, the tonnage mined per fatality was 651,000; at truck mines, 432,000.

Eight Miners Killed In Anthracite Blast

Five miners were killed immediately, and three others later died in the Wilkes-Barre General Hospital, as a result of explosions occurring in the No. 9 slope of the Ross vein of the Franklin colliery of the Lehigh Valley Coal Co., Wilkes-Barre, Pa., Dec. 11. The men were reportedly working in a section about 1,000 ft. underground and 2,000 ft. from the entrance to the area. The 250 men working in other sections of the mine were sent home that day though unaffected.

Two explosions within a short time of each other were reported but their cause was not immediately determinable. State and federal authorities immediately launched investigations of the disaster. Meanwhile, reopening of the mine, except for the section affected, was authorized.

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SPEAKERS at the Barnesboro meeting, left to right: D. C. Jones, director, Mineral Industries Extension Services, Pennsylvania State College; Clyde H. Maize, Pennsylvania State Mine Inspector, 20th Bituminous District; M. J. Ankeny, U. S. Bureau of Mines, Washington, D. C., and Dr. E. B. Van Ormer, associate professor of psychology, Pennsylvania State College.



OFFICERS of the 15th Bituminous District Coal Mining Institute, left to right: T. L. Stafford, director; J. G. Nicholson, treasurer; Dennis J. Keenan, president; Walter Myers, director; R. T. Todhunter Sr., president, Barnes & Tucker Co., who gave the address of welcome; Thomas Lamont, director; George Dunchuck, director; John J. Dougherty, secretary; and Richard Todhunter Jr., director.

Safety, Training, Mine-Sealing, Topics at Barnesboro Meet

Maintenance training, Pennsylvania's new mine-sealing program, education in accident prevention, and the psychology of the worker relative to accidents were topics discussed at the 32nd annual meeting of the Coal Mining Institute of the 15th Bituminous District at Barnesboro, Pa., Nov. 29. Snow and ice on the highways, and mines operating that day, held the attendance to 119. Dennis J. Keenan, president, was chairman of the technical session.

The recent influx of new types of mechanical-mining equipment has placed a tremendous burden on mine-maintenance forces, said D. C. Jones, director of Pennsylvania State College's Mineral Industries Extension Services, in a paper on, "A Training Program for the Mine Maintenance

Employee." The number of pieces of equipment to be maintained has, in some instances, been doubled, and many of the new machines are complicated in their designs and controls. In the past, most mine maintenance men have been experience trained—save for a few who have taken special courses at trade schools or by correspondence. The majority of mine mechanics are not trained sufficiently, said Mr. Jones, to be entrusted with the repairs of modern machine controls, except when they work under the guidance of a master mechanic or someone else equally capable.

Recognizing the need for widespread training among the maintenance men of Pennsylvania's coal mines, the Mineral Industries Extension Services of The Pennsylvania

State College developed, at the request of the industry, a program of training designed not only to provide the specific knowledge needed by those mine mechanics with little or no experience, but also to act as an upgrading program for those with greater experience.

The type of work offered in the "mine maintenance" programs in the terms from 1939-40 to 1943-44 was quite different from what is given today, said Mr. Jones. The training in the earlier programs consisted of three consecutive courses, each consisting of 10 two-hour sessions, or a total of 60 hours. The first course included a brief review of arithmetic, principles of mechanics and strength of materials. The second dealt with the mechanical applications of mechanized-mining equipment and the third with electrical theory as applied to the operation of mine machinery. The program was offered to mechanics, machine operators and supervisors. One fault of this program was that it attempted to cover too much ground in too short a time, and it did not permit much detailed study of any particular phase of mine-maintenance work.

The program attained significant success until the war and mines started their six-day production schedule and the draft began taking the younger and more interested men. The 1942-43 term was the low point in interest among all mining companies, with not a single mechanical mining class organized in the coal fields of Pennsylvania. However, about this time men in the industry interested in this training indicated that emphasis should be placed on the training of mine mechanics in electrical theory and application. A course embracing these ideas was developed from the former "third course" and tried out with two groups, one having shop facilities. The course was successful but results indicated the necessity for a shop program to parallel the class work.

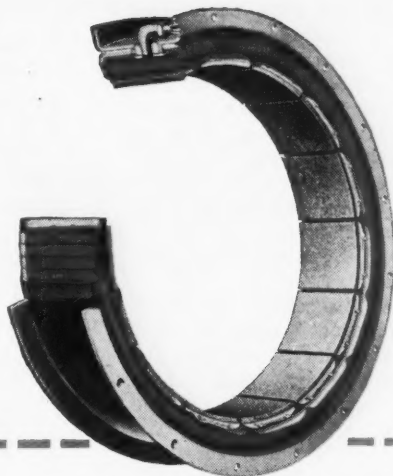
The type of program pushed in the various class locations from the 1943-44 term on, stated Mr. Jones, has been the "electrical applications" course designed specifically for mine maintenance men. Briefly, the course consists of introductory studies in arithmetic, followed by studies of the fundamental theories of electricity as applied to the transmission of power and operation of electrical equipment. Shop work is introduced as soon as the students understand the theory of motor operation and control, and emphasis is placed on each student participating in the dismantling and reassembly of motors and controls, in "shooting trouble" on motors, reading wiring diagrams, hooking up electrical equipment and checking flame-proof equipment for permissibility. Time also is provided for instruction in welding and cutting.

The course, at present, consists of

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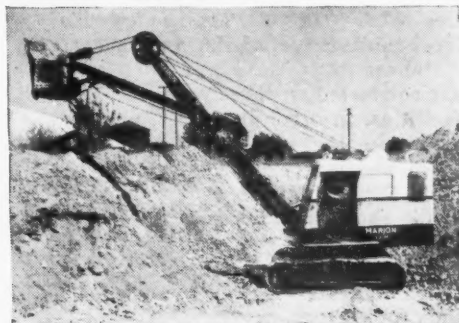
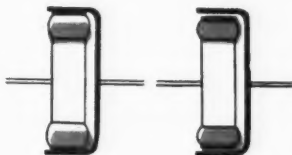
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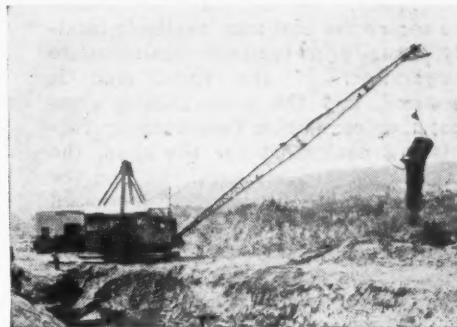
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150 hours of study with each class meeting twice a week for a 2½-hour session. A variation of this schedule provides for half of the course during each of two terms, with men on each cross shift attending class on alternate two-week periods. Text material for the course, provided by the Pennsylvania State College, consists of "Mining Mathematics" and "Mechanized Mining Electrical Applications" textbooks.

The training programs are operated under federal vocational acts that provide tuition-free classes for the men and run by local school boards, with teachers paid by the boards. Money expended for instructional expense is reimbursed from state and federal funds. Shop facilities, where possible, are requested of local mining companies, and in some instances both class and shop work are conducted on these premises. Shop facilities, in other instances, are provided in the school buildings, but these are rarely as complete as the mine shops. Failure to provide adequate shop facilities has resulted in poor instruction and subsequent failure of the class in several instances, which indicates the importance of a shop for each class.

The key man in the operation of a successful maintenance course is the instructor. We try, said Mr. Jones, to secure the best man available locally, usually a top-rank maintenance supervisor. If the right man is secured, and the local mining company or companies cooperate by furnishing equipment for the shop, the results secured are excellent, and the companies benefit through increased efficiency of their employees. To secure the best results, summarized Mr. Jones, each class program demands a cooperative school board, a high-grade instructor and cooperative coal companies.

Now that the maintenance training program has a good start, the Mineral Industries Extension Services' next desire is to be able to provide specific training for supervisors and employees studying for a state certificate examination.

Pennsylvania's Act No. 490, requiring the sealing of abandoned coal mines, became effective Sept. 1, 1947, declared Clyde H. Maize, state mine inspector for the 20th Bituminous District, in a paper on "Mine Sealing." Both Act No. 55 (approved May 7, 1935) and Act No. 490 are related to The Pure Stream Acts No. 394 (June 22, 1937) and No. 177 (amending Act No. 394, May 8, 1945). The Pure Stream Acts, enforceable by the Sanitary Water Board, were passed to "preserve and improve the purity of the waters of the Commonwealth for the protection of public health, animal and aquatic life, and for industrial consumption, and recreation," but no provision was made in either act for sealing abandoned mines.

The following quotation from the

Equipment Approvals

Nine approvals of permissible equipment were issued by the U. S. Bureau of Mines in November, as follows:

Mines Equipment Co.—Type PGKK junction box; 440 volts, a.c.; three branch circuits equipped with De-lon-type circuit breakers; Approval No. 591A; Nov. 3.

Joy Mfg. Co.—Type 148U-7RA/B loader; four 7½ hp. and one 4-hp. motors, 250 and 500 volts, d.c.; Approvals Nos. 592 and 592A, respectively; No. 10.

Ingersoll-Rand Co.—Model 130 air compressor; 30-hp. motor, 250 and 500 volts, d.c.; Approvals Nos. 593 and 593A, respectively; No. 13.

Goodman Mfg. Co.—Type G-12½ shaker conveyor; 10-hp. motor, 3 phase, 60 cycles, 500 volts, a.c.; Approval No. 594A; Nov. 18.

Joy Mfg. Co.—Type 128U-9E/FLE loader; five 4-hp. motors, 250 and 500 volts, d.c.; Approvals Nos. 595 and 595A, respectively; No. 19.

Joy Mfg. Co.—Type 148U-7RC loader; four 7½-hp. and one 4-hp. motors, 250 and 500 volts, d.c.; Approvals Nos. 596 and 596A, respectively; No. 21.

Ingersoll-Rand Co.—Model 85 air compressor; 20-hp. motor, 250 volts, d.c.; Approval No. 597; Nov. 24.

Mines Equipment Co.—Type PGGG junction box; 250 volts, d.c.; four branch circuits equipped with De-lon-type circuit breakers; Approval No. 598; Nov. 24.

Joy Mfg. Co.—Type 88U-11N/KK/GG/LKK loader; one 15-hp. motor, 250 and 500 volts, d.c.; Approvals Nos. 599 and 599A, respectively; Nov. 25.

preamble of Act No. 55 is of interest: "Whereas, it is a known fact that the combination of oxygen and water is necessary to liberate the sulfuric acid content from the pyrites of iron and sulfur in coal seams, thus making mine water discharge impure; and also that the caving of pit mouths, thus cutting off the air, shortly makes the seepage coming from the abandoned mine again pure, therefore..."

Act No. 55, which, in part, specified that all operators must seal abandoned coal mines that were discharging polluted waters into the streams and rivers, had numerous weaknesses, as for example:

1. There was nothing in the act to compel operators to seal abandoned mines.

2. No provisions were made to seal abandoned mines, the operator of which had been lost in antiquity.

3. No appropriations were allocated to the Department of Mines for the necessary sealing.

4. All sealing that was done, was done by W.P.A. labor, standards, procedure and technique.

5. The need for W.P.A. allotments and W.P.A. has ceased to exist.

6. No provisions were provided to prevent the destruction of the seals or of the cutting into of sealed areas erected by W.P.A.

Act No. 490, a mine-sealing law with "teeth," which Richard Maize, Secretary of Mines, was requested to write, places the mine-sealing program under the control and supervision of the Department of Mines. An appropriation of \$1,090,000 was requested in Act No. 490 and the program is to be prosecuted as an engineering and mining project.

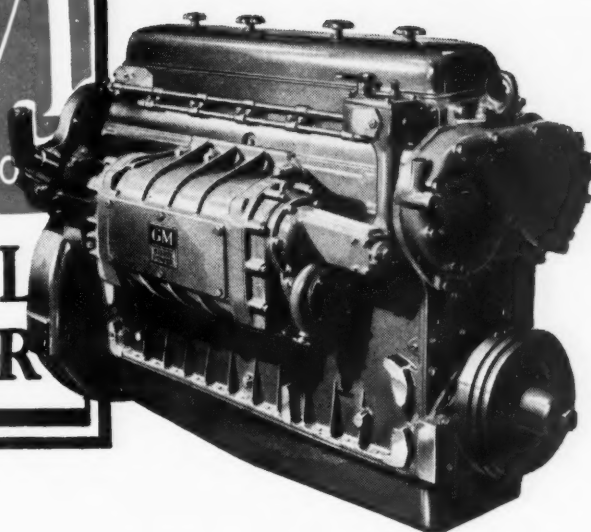
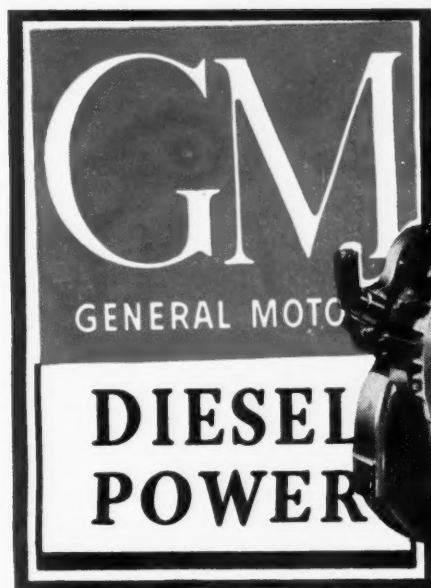
Heading up the organization of the mine-sealing project in the bituminous division is the Secretary of Mines (Harrisburg) and an engineer in charge, located in Ebensburg. Also in the Ebensburg office will be: a secretary, chemist, draftsman, two stenographers, two file clerks, accountant, master mechanic and storekeeper.

Four district engineers, located at Clarion, Curwensville, Meyersdale and Greensburg will report to the Ebensburg office. Each district engineer will have a reconnaissance engineer, sample collector, stenographer, four foremen (certified mine foremen), bulldozer operator, shovel operator, two truck drivers, six handy men and 24 laborers.

The reconnaissance engineers will start at the headwaters of the streams in their districts and plot all abandoned openings in the area. The district engineers will determine if the abandoned mines are being used as ventilation or escapeways for operating mines and if they are in the possession of the operator who removed the coal. Then, depending upon the information obtained, each district engineer will assign equipment and crews to seal the openings as required by the act. The sample collectors will take samples to determine the pH of the water before the seals are erected and periodically thereafter.

The sealing of abandoned openings, said Mr. Maize, is to be done so as to permit the outflow of water that may accumulate therein, while at the same time preventing the flow of appreciable quantities of air into the mine. Operators engaged in mining, upon abandonment of a mine, are to seal all openings. Work is to start within 60 days and be completed within six months. Penalty for refusal to properly seal mine openings or for destroying any seal, without the approval of the Department of Mines, is a fine of not less than \$100 or more than \$1,000, or imprisonment for not more than a year or both.

All abandoned openings, not used for ventilation or escapeways for operating mines, from which water is not flowing, will be sealed with a solid 9-in. seal, and the portion of the



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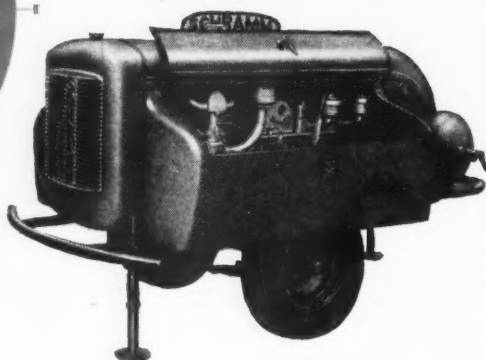
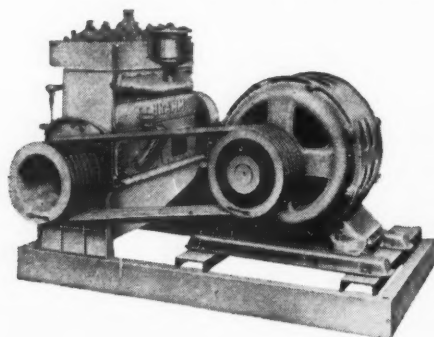
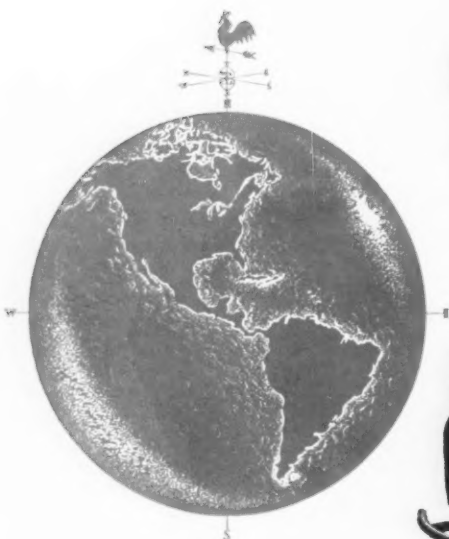
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opening between the seal and the portal will be blasted shut or otherwise closed. All abandoned shafts, even though filled with water, will be completely filled from bottom to top with material that shall not contain more than 10 percent combustible matter, unless there be some extenuating circumstances requiring that they not be filled.

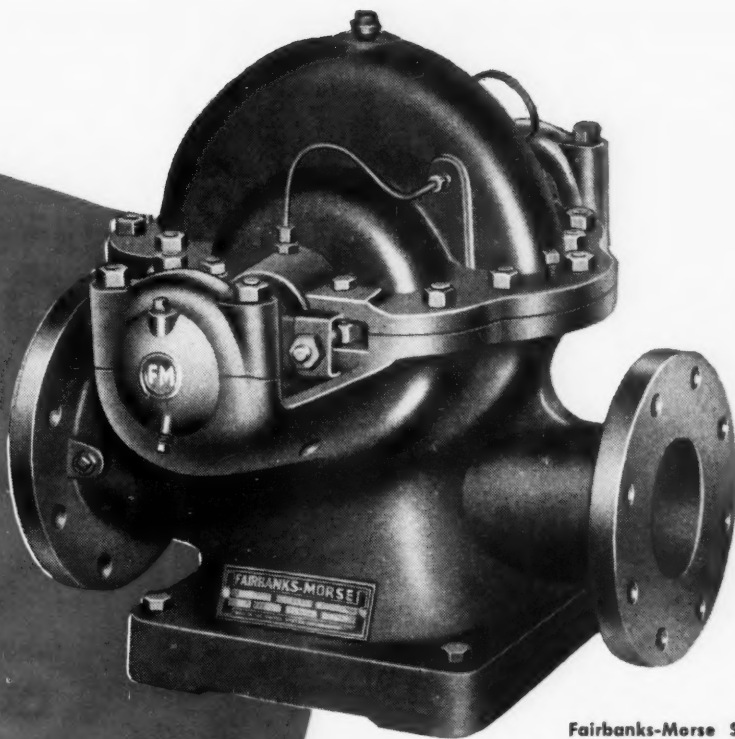
The purpose of Act No. 490, then, continued Mr. Maize, is to permit water to flow to the surface without having first liberated the sulfuric-acid content from the pyrites of iron and sulfur in coal seams by the admission of oxygen, thereby preserving and improving the purity of the waters of the Commonwealth.

Accidents at the face were reduced by more than 50 percent recently in one southern West Virginia district where the union and management combined their efforts in a safety drive, reported M. J. Ankeny, U. S. Bureau of Mines, Washington, D. C. Discussing the subject, "Bureau of Mines Education Program in Accident Prevention," Mr. Ankeny, who until very recently was stationed at the Mt. Hope, W. Va., station, said one important phase of the program was the instruction of the mine safety committeemen. When the Federal Mine Safety Code was made a part of the new agreement the mine safety committees were not sufficiently well informed on code and safety matters to be able to discharge their duties effectively, he said. Thus, this phase of the Bureau's program is aimed at a real need. Another phase, said Mr. Ankeny, is the revival of instruction in accident prevention for mine officials. Eight men with engineering degrees and training are to resume this work.

Psychology is defined as the study of the behavior of individuals, declared Dr. Edward V. van Ormer, associate professor, Pennsylvania State College, in his talk on "The Psychology of the Mine Worker Relative to Accidents." Psychology means the study of the mind, that is, what goes on in people's minds, how they see and hear, how they learn and think, why they are afraid, why they become unhappy, what things make them happy—in general, what makes them do the things they do. Psychologists do not know all the answers regarding human behavior by any means, said Mr. van Ormer. But because he is interested in the general question of why people do what they do the psychologist may be able to help in understanding why people have accidents as they do. In mining particularly, there is the question of why accidents occur when men have been taught better, and know better, and still do things that produce accidents.

Accidents do not take place by chance, said Mr. van Ormer. There always is a cause or causes to bring them about. Safety engineers have

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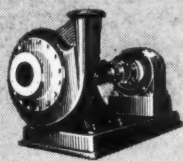


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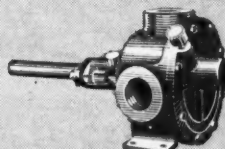
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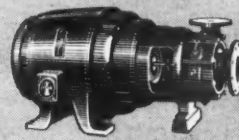
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estimated that 98 percent of industrial accidents have occurred as the result of preventable causes. Only ten percent of industrial accidents are reported to result from faulty equipment and bad building conditions. Some mine accidents result from the use of improper equipment for the job. For example, not wearing a hard hat and hard-toed shoes would seem to be inviting injury. The man who needs glasses to give him good vision, but does not have his goggles ground to the prescription of his glasses, doesn't have the right equipment.

Another type of accident is the one that occurs because of breakdowns of equipment. In spite of all precautions and the proper maintenance of equipment, some few accidents from this cause are bound to happen. Other accidents result from the fact that a man does not have sufficient knowledge or sufficient skill to carry out a job in the proper way and with the necessary safety precautions. The National Safety Council has estimated that some 30 percent of industrial accidents could be classed in this group. One reason for this deficiency is faulty instruction. Too often a boss expects a man to get the information in a few words or with a very brief demonstration. He does not take the trouble to go over the information a number of times and check the man's knowledge of it by asking questions. Nor does he give the worker sufficient practice in carrying out certain operations under his supervision before he permits him to do them by himself. Another reason for the apparent lack of sufficient knowledge and skill may be that safe practices are not stressed enough in instruction. The man is unaware of the safe way, or at least not convinced that another way is unsafe. Safety education should not mean just first-aid training in rescue work but should also include instruction in the right way of doing a job with full knowledge of the hazards of the wrong way.

Studies in other industries show that some individuals have more accidents than others. A study of automobile drivers in Connecticut disclose that 6 percent of the drivers were responsible for 72 percent of the accidents. This is termed "accident proneness." Some of the physical and mental characteristics of accident-prone workers are: (1) temporary or permanent lack of physical fitness for a particular job; (2) fatigue on the job; (3) poor vision or hearing; (4) sudden illness on the job, perhaps growing out of the person's diet; (5) slow or awkward response; (6) slow and poor judging of the speed of moving objects; (7) lusele responses take place ahead of vision; (8) poor motor coordination.

The opposite of all these slow responders is the well-trained and skilled worker who does the right thing at the right time automatically, before he has a chance to think what

he should do. This worker learns the right ways of doing things and practices them until they become automatic habits with him so that he can even carry out some operations while watching something else. He practices doing things under all kinds of conditions and thinks about what he would do in this or that situation if it should come up suddenly. More study is needed on the characteristics of this type of worker, how he can be selected, and the best type of training to give him.

The National Safety Council has estimated that 50 percent of the industrial accidents stem from psychological or personality causes. The workers wilfully disregard instructions; they seem to be absent-minded, reckless, nervous, etc. Some of the psychological causes seem to be limited intelligence and a poor safety attitude. Factors affecting a poor safety attitude are: (1) resentment of mechanical safety devices for the worker; (2) recklessness—the "I know all about it" attitude; (3) resentment of authority.

Another group of psychological or personality factors that seem to enter into accident proneness are: (1) emotional reactions which interfere with a man's efficiency; (2) dissatisfaction with the job; (3) absent-mindedness; (4) pre-occupation with day-dreams; (5) excessive emotional reactions—workers who have extreme "ups and downs."

Excessive emotional reactions may indicate a lack of balance in the worker's satisfaction of the basic human needs. First of all there are the bodily needs for: food; satisfaction of thirst; avoidance of pain; keeping the body comfortable; ability to rest and sleep when tired; and an opportunity to exercise. Then there is the urge for self-assertion and self-esteem, the need for feeling somewhat independent economically and being able to provide future economic security for themselves and their family. The typical human being also has a strong urge to belong to some group or a number of large groups such as clubs, lodges, churches and political parties. Another strong urge seems to be the social approval of others for work well done. A few words of praise or recognition from the boss means a lot to a workman. It also seems quite clear that the average man wishes to marry and have a family and feel that he receives affection from his wife and family.

When an individual is not receiving sufficient satisfaction in one or more of these basic needs, some peculiar reactions may result. Such things are: recklessness, resentment of authority, absent-mindedness, dissatisfaction and excessive emotional reactions of various sorts. Even the development of some mental disorders begin in this way.

The most important phase of safety,



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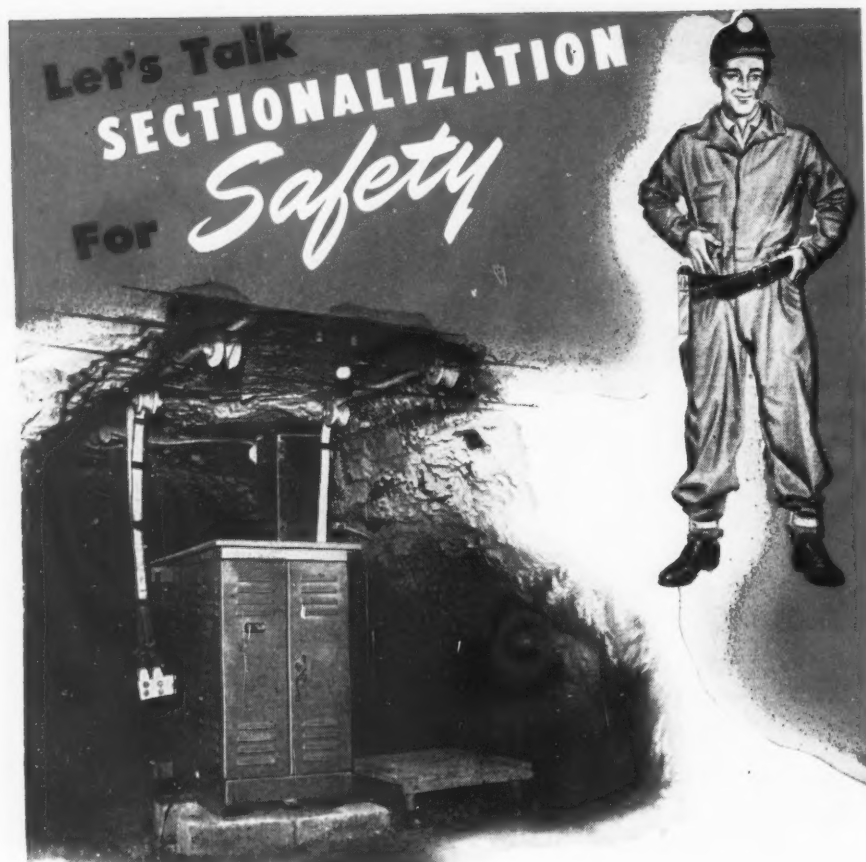
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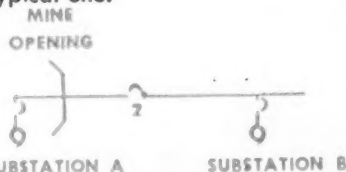


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Be Wise SECTIONALIZE

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1ST OF A SERIES ON RECOMMENDED SECTIONALIZING PRACTICE USING THE KSC.



concluded Mr. van Ormer, is dealing with the individual human being—the most important reason for accident prevention, the avoidance of human suffering.

Obituary

William H. Nichol, 70, vice president in charge of operations, Enos Coal Mining Co., Oakland City, Ind., died Dec. 3 in the Gibson General Hospital at Princeton, Ind., of injuries suffered in an automobile collision Nov. 29.

Ernest Hornsby, 51, superintendent, Blue Pennant mine, Glogora Coal Co., Blue Pennant, W. Va., died Dec. 1 in a Charleston, W. Va., hospital, following a short illness. Mr. Hornsby had been superintendent of the Blue Pennant mine for 20 years.

H. M. Thompson, 52, treasurer, West Kentucky Coal Co., Earlington, Ky., died Dec. 4 at his home in Madisonville, Ky. Mr. Thompson had been associated with the company for more than 25 years and had held various positions.

M. D. Bouldin, 63, general superintendent, Imperial Colliery Co., Burnwell, W. Va., since 1916, died Dec. 5 in a Charleston, W. Va., hospital.

Johnstone Campbell, superintendent, Drifton shops, Lehigh Valley Coal Co., Drifton, Pa., died Dec. 5. Mr. Campbell, who was born in Glasgow, Scotland, had been superintendent of the Drifton Shops for 32 years.

Coal Men Make Grants To Kansas University

A grant of \$2,000 has been made to the University of Kansas by Kenneth A. Spencer, president, Pittsburgh & Midway Coal Mining Co., and Grant Stauffer, president, Sinclair Coal Co., according to an announcement by Deane W. Malott, chancellor of the University. The fund is to be used to finance studies of coal in southeastern Kansas and southwestern Missouri.

Hanna to Build Homes

Purchase of a 41-acre site near Cadiz, Ohio, and plans to build 120 dwellings for its employees were announced last month by the Hanna Coal Co., St. Clairsville, Ohio. The homes will be sold to the workers at cost, now tentatively estimated at \$10,000 to \$15,000, it is reported. Total cost of the project is estimated from \$1,200,000 to \$1,500,000.

Winter stripping operations continue at mines using **WALTER TRACTOR TRUCKS**



ONE of the great advantages enjoyed by operators of Walter Tractor Trucks is the extra Winter work days gained with these super-traction haulers.

When other trucks lose traction and stall on snow, ice, mud or slippery grades, Walter Tractor Trucks move steadily ahead. As a result, you con-

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Featuring 300 hp. engines, suspended double reduction drive, tractor type transmission, short wheel base, hydraulic steering and air brakes, Walter Tractor Trucks offer you the most powerful, productive trucks for year 'round strip mine hauling. Send for descriptive literature.

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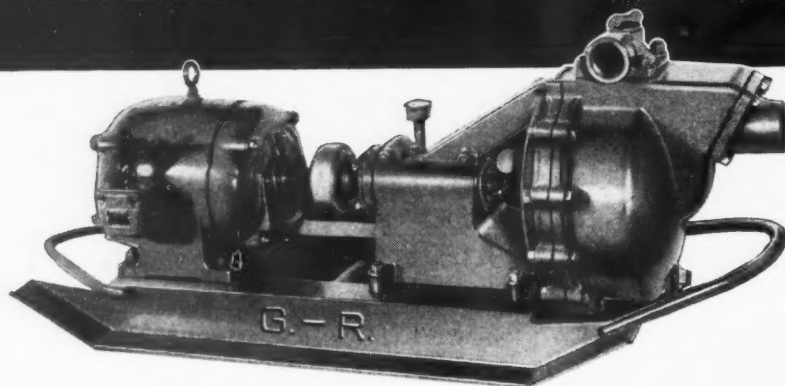
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Positive and powerful self-priming. No adjustments required between prime and run - start the motor and you start the water.

Sand, muck or solids that will pass the intake strainer WILL NOT CLOG or harm a Gorman-Rupp.

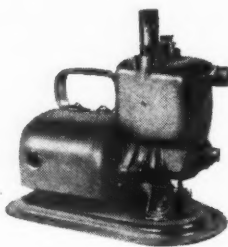
Absolute Simplicity - only one moving part, the impeller - no reduction gears or valves. All wearing parts can be quickly replaced by an inexperienced man with common tools.

You can't beat a Gorman-Rupp for dependability and performance. Available in capacities from 50 to 200 GPM and heads up to 125 feet. Write today for special mine bulletin showing some interesting actual installations, or contact your nearest distributor.

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This tiny, all bronze MINE SPRAY PUMP weighs only 27 lbs. Exceedingly valuable for coal dust control and any number of other uses around the mine.

Fitted for using with ¾" pipe or common garden hose - lifts up to 25 feet - delivers 8 GPM at 40 lbs. pressure. Maximum capacity 16 GPM - Maximum pressure 50 lbs. Electric motor driven, completely self-priming, ready for instant use. Write for Bulletin 7 ME-11.



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Association Activities

Southeast Section, A.I.M.E., at its annual meeting elected as chairman James C. Gray, general superintendent of coal mines, Tennessee Coal, Iron & R.R. Co., Birmingham, Ala., succeeding Dr. Walter B. Jones, Alabama State Geologist, Tuscaloosa. W. C. Chase, general superintendent of mines, Alabama By-Products Corp., Birmingham, was elected first vice chairman; and W. C. McKenzie, chief engineer of ore mines and quarries for T.C.I., Bessemer, was named second vice chairman. R. Q. Shotts, School of Mines, University of Alabama, was elected secretary-treasurer. Clyde Williams, president of the A.I.M.E., addressed the group on industrial research progress.

Coal Producers Committee for Smoke Abatement has named H. B. Lammers, formerly director of engineering, chairman of the group, succeeding R. E. Howe, president, Appalachian Coals, Inc., who resigned because of pressure of other work. R. L. Ireland, Jr., president, Hanna Coal Co., Cleveland, was named vice chairman. A. L. Brown, formerly general sales manager, Consolidation Coal Co., was named to the newly created position of executive secretary.

Correction

Because of a typographical error not caught in proofreading, the article, "Strippers Moved 12 Miles," Coal Age, December, 1947, incorrectly stated: "Average thickness of the overburden at the Mineral pit is about 140 ft." The correct thickness is 40 ft.

Preparation Facilities

Oak Ridge Mining Co., Raven Run, Pa.—Contract closed with Menzies Separator Co. for one 4-ft. Menzies cone to clean rice coal, feed capacity, 22 t.p.h.; and one 4-ft. cone to clean barley, feed capacity, 22 t.p.h.

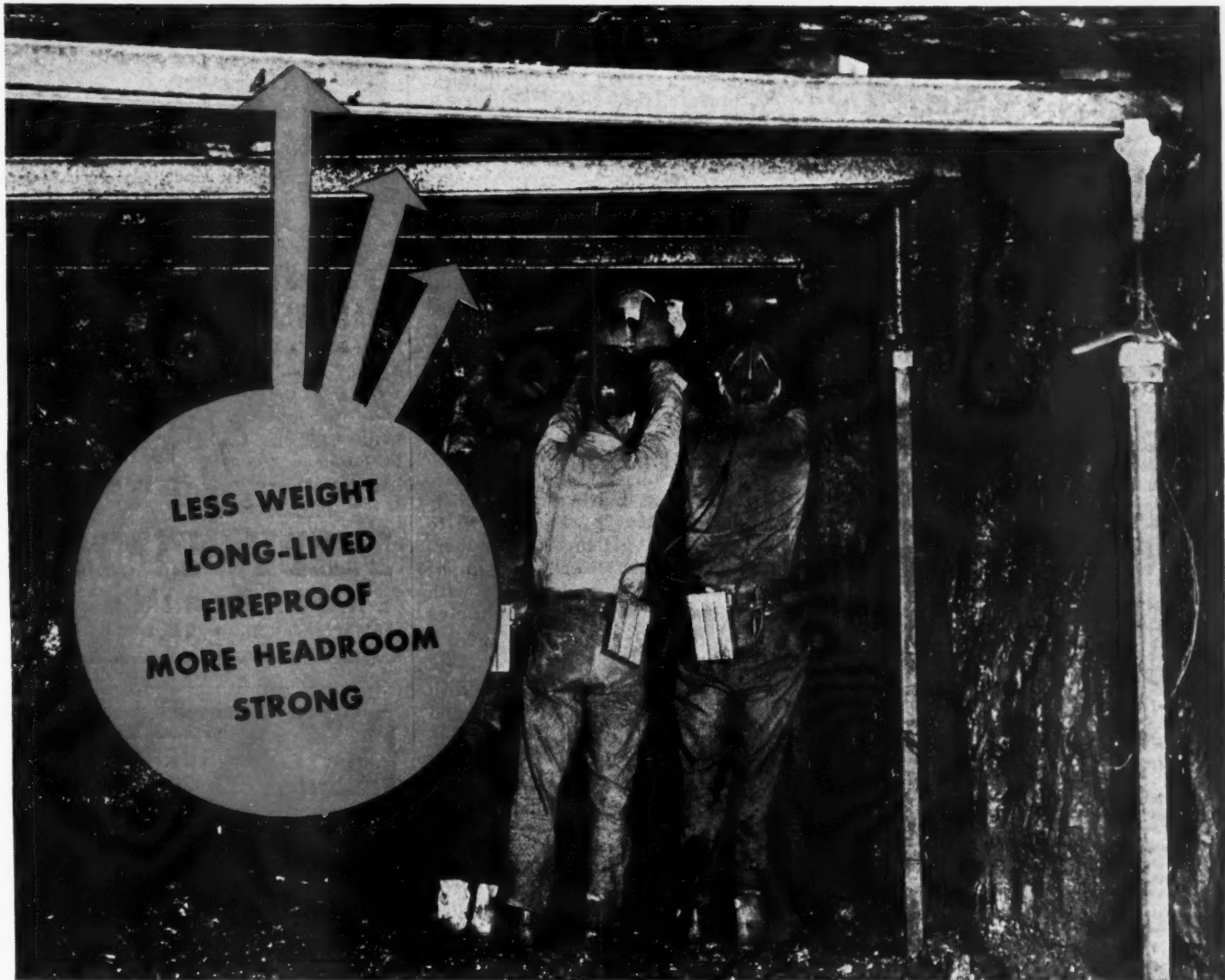
Millersville Colliery Co., Millersville, Pa.—Contract closed with Menzies Separator Co. for one 4-ft. Menzies cone to clean barley coal, feed capacity 22 t.p.h.; and one 4-ft. cone to clean No. 4 buckwheat, feed capacity, 22 t.p.h.

Simpson Coal Co., Simpson, Pa.—Contract closed with Menzies Separator Co., for one 18-in. Menzies cone to clean barley coal, feed capacity, 5 t.p.h.

Hoover Coal Co., Paximos, Pa.—Contract closed with Menzies Separator Co. for one 4-ft. Menzies cone to

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Indian Head Coal Co., Tremont, Pa.—Contract closed with Menzies Separator Co. for one 8-ft. Menzies cone to clean broken and egg coal, feed capacity, 90 t.p.h.

Mammoth Coal Co., Raven Run, Pa.—Contract closed with Menzies Separator Co. for one 4-ft. Menzies cone to clean barley and No. 4 Buckwheat refuse, feed capacity, 22 t.p.h.

Markson Coal Co., Goodspring, Pa.—Contract closed with Menzies Separator Co. for one 8-ft. Menzies cone to clean rice and barley coal, feed capacity, 70 t.p.h.

Semet-Solvay Division, Allied Chemical & Dye Corp., Harewood mine, Longacre, W. Va.—Contract closed with Heyl & Patterson, Inc., for coal-washing plant, to include 20 Deister Concentrator tables and 6 Bird filters; capacity, 200 t.p.h. of $\frac{3}{4}$ x0-in. coal.

Carbon Fuel Co., No. 9 mine, Carbon, W. Va.—Contract closed with Roberts & Schaefer Co. for complete coal-preparation machinery in existing plant; capacity, 150 t.p.h.; to clean $\frac{1}{4}$ x0-in. coal in R&S Super-Airflow pneumatic coal-cleaning units; Also Unit Hydrotator, complete with screens, tanks, refuse disposal, etc., capacity, 40 t.p.h.

Peters Creek Coal Co., Summersville, W. Va.—Contract closed with Roberts & Schaefer Co. for tippie and preparation plant, capacity 540 t.p.h. of run-of-mine coal; 4x1-in. to be cleaned at the rate of 300 t.p.h. in tandem Hydro-Separator and 1x $\frac{1}{4}$ -in. to be cleaned in Hydrotator Process Unit at the rate of 100 t.p.h.

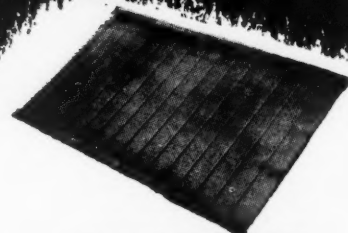
Warner Collieries Co., Mammoth, W. Va.—Contract closed with Roberts & Schaefer Co. for five-track tippie and preparation plant, capacity 350 t.p.h. of run-of-mine; to include picking tables, shaker screens, loading booms and tandem Hydro-Separator washing 5x $\frac{3}{8}$ -in. coal at 200 t.p.h.; unloading and cleaning facilities for foreign coal to be provided.

Warner Collieries Co., Wolf Run Mine, Bergholz, Ohio—Contract closed with Roberts & Schaefer Co. for five-track tippie and preparation plant, capacity, 350 t.p.h. of run-of-mine; to include picking tables, shaker screens, loading booms and tandem Hydro-Separator washing 5x $\frac{3}{8}$ -in. coal at 200 t.p.h.

Lillybrook Coal Co., No. 3 mine, Killarney, W. Va.—Contract closed with Roberts & Schaefer Co. for R&S Super-Airflow pneumatic coal-cleaning units and accessories; capacity, 50 t.p.h. of $\frac{3}{4}$ x0-in. coal.

Raven Red Ash Coal Co., Red Ash, Va.—Contract closed with Roberts & Schaefer Co. for R&S Super-Airflow pneumatic coal-cleaning unit with ac-

SCREENS FOR EVERY COAL PREPARATION JOB



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OHIO CARBON BRUSHES



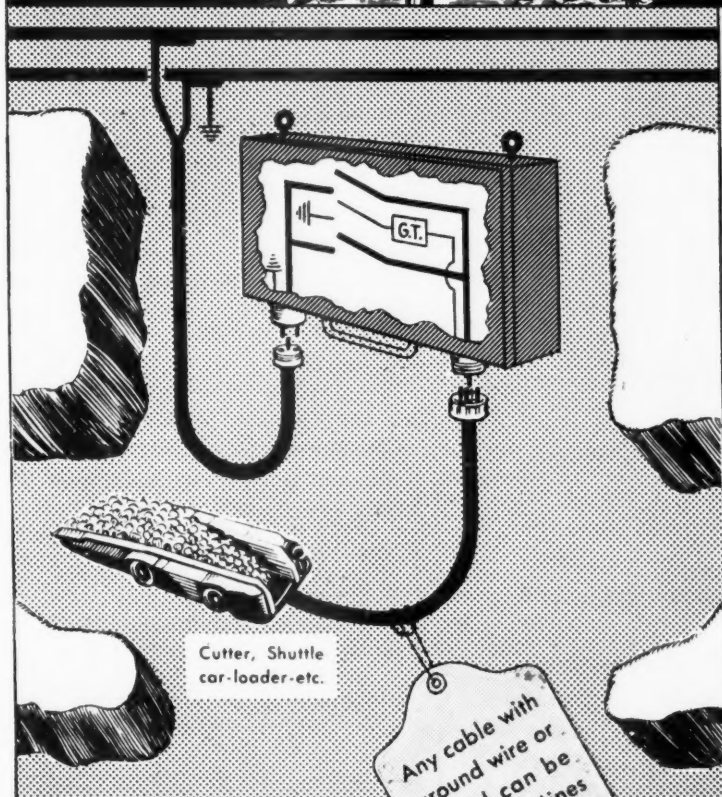
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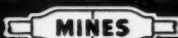
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MINES EQUIPMENT COMPANY

4229

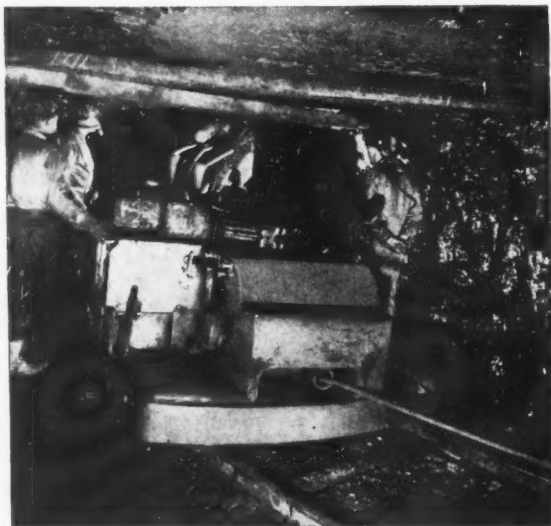
CLAYTON AVENUE



ST. LOUIS 10, MO.

MAKE A CUT...

IN MOTOR BURNOUTS



WHEN OVERLOADS DEMAND "SOMETHING EXTRA" from mine motors, make sure that they have something extra to protect them from overheating and burnouts. There's no better Class B insulation than Deltabeston* magnet wire. Many leading mines have made Deltabeston a standard specification for motor rewinding and repair.

The Deltabeston line of magnet wires includes both asbestos and glass-insulated types, round, square, and rectangular, in a full range of sizes. It is the product of top-rank experience in heat-resistant wire. Our engineers can give you practical, point-of-use advice for any combination of operating conditions. Deltabeston wires and cables are widely available when you need them.

For complete information on Deltabeston magnet wire and other products "built to beat the heat," write Section Y50-114, Appliance and Merchandise Department, General Electric Company, Bridgeport 2, Connecticut.

*Trade-mark Reg. U.S. Pat. Off.



GENERAL  ELECTRIC

cessories; capacity, 40 t.p.h. of $\frac{1}{4}$ x 0-in. coal.

M. & M. Coal Co., Schuylkill Haven, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal-Deck No. 7 coal-washing table to handle No. 4 buck.

Silverton Coal Mining Co., Cresona, Pa.—Contract closed with Deister Concentrator Co. for one Concenco revolving fee distributor for feed distribution to three SuperDuty Diagonal-Deck coal-washing tables.

A. L. Forney Coal Co., Danville, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal-Deck No. 7 coal-washing table to clean No. 1 buck.

The Middle Eccla (Witbank) Development Co., Johannesburg, South Africa.—Contract closed with Jeffrey Mfg. Co. for washing plant to prepare 6x $\frac{1}{4}$ in. coal; capacity, 144 t.p.h. raw-coal feed.

Hatfield-Campbell Creek Coal Co., Pt. Lick, W. Va.—Contract closed with Jeffrey Mfg. Co. for washing plant to prepare 6x0-in. coal; capacity, 350 t.p.h. raw-coal feed.

Central-Elkhorn Coal Co., Lackey, Ky.—Contract closed with Jeffrey Mfg. Co. for two unit washers to handle 5x $\frac{3}{8}$ -in. coal; capacity, 75 t.p.h. raw-coal feed.

Lambert Coal Co., Seth, W. Va.—Contract closed with Jeffrey Mfg. Co. for unit washer to handle 5x $\frac{3}{8}$ -in. coal; capacity, 75 t.p.h. raw-coal feed.

Jackson Mining Co., Brounland, W. Va.—Contract closed with Jeffrey Mfg. Co. for unit washes to handle 5x $\frac{3}{8}$ -in. coal; capacity, 75 t.p.h. raw-coal feed.

Dayton Coal Co., Surosa, W. Va.—Contract closed with Jeffrey Mfg. Co. for unit washer to handle 5x $\frac{3}{8}$ -in. coal; capacity, 75 t.p.h. raw-coal feed.

New Mining Companies

Unconfirmed reports received list the following companies, among others, as having been incorporated to mine coal, with authorized capital and incorporators as listed:

Kentucky

Pertlecherry Coal Co., Lexington; \$10,000; Lillah B. Farmer, Ralph B. Conlee, Russell White.

Virginia

C. & T. Company, Inc., Ward's Road, Box 817, Campbell County; \$50,000; R. W. Chandler, Lynchburg, president.

Enoch Branch Coal Corp., Harman; \$25,000; R. V. Venable, president.

C. G. Poole, Inc., Pardee; \$250,000; C. D. Smith, agent.

South Atlantic Coal Co., Salem; \$100,000; J. F. Hunter, president.

West Virginia

Dixon, Nida & Ramsey Coal Co., Madli-



**Drill Faster!
Last Longer!
Cost Less!**

Smooth, straight holes drilled with Kennametal bits cost less, save time, and reduce maintenance expense. Compared to other types of bits used for the same purpose, they require less power to drive . . . stay sharp much longer. The tough, hard Kennametal tip stands up longer; has high resistance to abrading, bending, or failing.

It's no wonder Kennametal drill bits have moved up so rapidly among mine operators. For, in addition to fast, low cost drilling in coal, they have the strength and hardness to drill through hard rock and slate.

You can't be handicapped by slate or bony "partings" when you drill with Kennametal. Its sharp, hard edge "bites" in quick, drills right through the rock—ordinarily it's no more difficult than drilling coal.

Kennametal-drilled holes are clean, single-gage—the charge has maximum effectiveness, which results in better breakage and fewer loading difficulties.

Before you buy drill bits, think what these advantages mean to you. For more information write the Mining Division, Kennametal Inc., Latrobe, Pa.

KENNAMETAL

THE WORLD'S LARGEST MANUFACTURER
OF CEMENTED CARBIDE MINING TOOLS

Fast Drilling

The average drilling speed with Kennametal is usually up to 50% faster than with any other type of bit. Abrasion-resistant Kennametal (thought of as the hardest metal in coal mining) remains sharp over long periods of drilling.

Long Service

Data collected in mines all over the country show that it pays to have bits that last the longest. It saves labor cost in terms of handling, changing, and sharpening. Some mines report that these features alone more than pay for the extra cost of Kennametal bits. Kennametal bits commonly last longer than 500 ordinary steel bits.

Low Bit Cost

Many mines report bit cost reductions of as much as 50% before Kennametal bits are dull. Since they can be sharpened many, many times before they are worn out, the bit cost should be reduced even more in many, many instances.

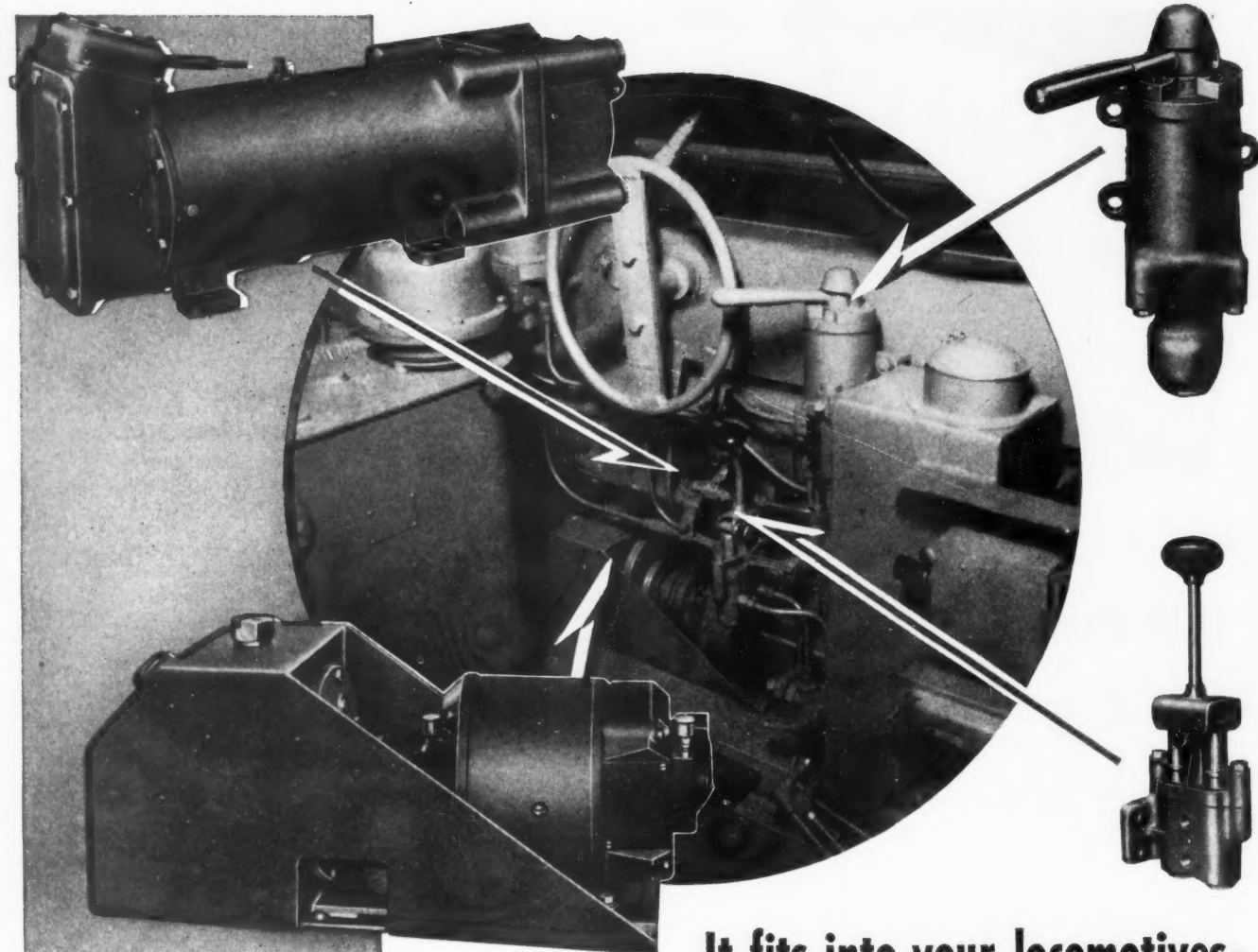
Low Maintenance Cost

Whenever a bit dulls or breaks it loads the drill. Loads cause the drill to overwork. Sooner or later the drill goes off the job, into the maintenance shop. Winding costs are high. Extra drills are needed if too many wear out or burn up at one time. Kennametal drill bits are your protection against these problems. They operate at 25% to 50% less amperage.

What is Kennametal?

Kennametal is the name of a very hard, durable tool material that was developed by Philip M. McKenna, the president of Kennametal Inc. This new metal is made of powdered particles of various metals, such as tungsten carbide, cobalt, and sometimes tungsten-titanium carbide. In the fine-ground stage it takes 18,000,000,000,000,000 particles to fill an average-size sewing thimble. The powdered particles are formed into Kennametal

solids by sintering the pressed ingredients together in special electric vacuum furnaces. In its solid state it has the best combination of strength, hardness, shock-resistance and rigidity of any metal processed by this method. Kennametal is called cemented carbide in industry, but it is distinct from other carbides either by the process and/or the ingredients that is used to manufacture it.



**It fits into your locomotives-
and into your haulage plans**

WESTINGHOUSE HYDRAULIC BRAKES

Here's the modern, *power* braking you need on your modern, high-speed locomotives . . . put up in a small package.

The engineers focused on compactness in the design. As a result, this brake system provides the instant response, flexibility of operation, and high braking forces essential for safe, speedy haulage . . . yet can be tucked away into unused corners and crannies of the locomotive.

The faster, better control permits

higher top speeds, and improves average speeds through faster brake application and release. Car spotting can be handled with greater ease and accuracy. Overall haulage efficiency takes a definite upward step, and maintenance from worn wheels, split pinions, and motor damage due to bucking takes a definite drop, when Westinghouse Hydraulic Brakes are installed.

Ask for bulletin SP 9092 for details. You can install these brakes the next time your locomotives are in the shop.

Westinghouse Air Brake Co.

WILMERDING

INDUSTRIAL DIVISION

PENNSYLVANIA



son; \$10,000; W. W. Dixon, V. Nida, Fred Ramsey.

Burgess Coal Co., Inc., Huntington; \$10,000; Clyde M. Burgess, H. Golden Burgess, Douglas G. Burgess.

Quick Coal Co., Charleston; \$10,000; Tom Johnson, J. C. White, J. A. Blagg.

M. & J. Coal Co., Williamson; \$25,000; R. M. Rowland, H. P. James and others.

Cleveland Interlake Coal Co., Inc., with offices in Cleveland, Ohio; \$500,000; Ben F. Fiery, Sherman Dye and Glenn E. Offenbacher.

H. & H. Coal Co., Williamson; \$10,000; Ermel D. Hatfield, Henry T. Hammond.

Hatfield-Dulaney Coal Co., Maynar, Raleigh County; \$25,000; Leslie Hatfield, T. W. Dulaney, John H. Waugh.

Industrial Mining Corp., Beckley; \$200,000; Arthur Miller, Joseph Cohan, William Rodgers.

Farland Fuel Co., Morgantown; \$50,000; Joseph S. and R. A. Farland, I. L. Newville.

Ball & Collins Coal Co., Hewitt; \$25,000; Harold C. Collins, Herbert L. Ball and others.

C. B. F. Coal Co., Charleston; \$10,000; I. V. Cunningham, C. O. Fox, O. S. Burnside.

Rich Valley Mining Co., Williamson; \$20,000; D. H. Herrold; T. R. Joseph, T. L. Lambert.

H. & B. Coal Co., Elkins; \$10,000; H. S. Bergdoll, William S. Bergdoll, Mrs. James R. Hymes.

Black Diamond Coal Co., Charleston; \$10,000; W. W. Akers, J. H. Weaver, Boyd Akers.

J. & J. Construction Co., Bluefield; \$20,000; J. E. Vest, Jack Bone, J. S. Vest.

Mine Fatality Rate Drops in October

Accidents at coal mines in the United States caused the deaths of 61 bituminous and 15 anthracite miners in October, 1947, according to reports furnished the U. S. Bureau of Mines by state mine inspectors.

For the two industries combined, in producing 62,386,000 net tons, the preliminary fatality rate in October was 1.22 per million tons, as compared with the latest figure of 1.39 for September, 1947. The preliminary rate for October, 1946, was 1.48, later revised to 1.73.

With a production of 56,890,000 tons, the preliminary bituminous rate was 1.07 per million tons in October, 1947, compared with the latest figure of 1.26 for September, 1947. The preliminary rate for October, 1946, was 1.34, later revised to 1.55.

The preliminary anthracite fatality rate for October, in mining 5,496,000 net tons, was 2.73 per million tons, compared with the latest September rate of 2.72. The preliminary rate for October, 1946, was 2.96, later revised to 3.71.

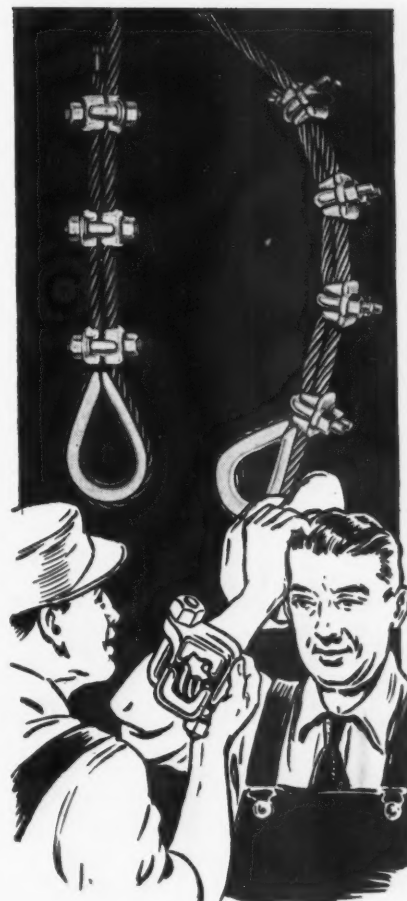
U. S. COAL-MINE FATALITIES IN OCTOBER, 1947, BY CAUSES AND STATES

State	Underground							Shaft	Open-cut	Surface	Grand total
	Falls of roof	Falls of face	Haulage	Gas or dust explosions	Explosives	Electricity	Other causes				
Alabama	4	1	..	..	..	..	..	..	..	..	5
Colorado	..	..	..	..	..	..	..	..	..	..	..
Illinois	..	..	..	..	..	..	..	..	..	..	..
Indiana	..	..	..	..	..	..	..	..	..	..	..
Iowa	..	..	..	..	..	..	..	..	..	..	..
Kansas	1	..	..	..	..	..	..	..	..	..	1
Kentucky	11	..	3	..	1	..	..	..	..	..	14
New Mexico	1	..	..	..	..	..	..	..	..	..	1
Ohio	33	..	..	..	..	..	..	..	..	..	33
Penna. Bituminous	..	..	1	..	..	..	1	..	1	..	2
Tennessee	..	..	..	..	..	..	..	..	..	..	..
Utah	1	..	..	..	..	..	..	..	..	..	1
Virginia	..	..	..	..	..	1	..	..	..	..	1
West Virginia	10	1	7	..	..	1	..	19	..	1	20
Total Bituminous	35	2	15	..	1	1	2	56	2	1	61
Penna. Anthracite	10	..	1	..	1	..	1	15	..	..	15
Total	45	2	16	2	2	1	3	71	2	1	76

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS* JANUARY-OCTOBER, 1947 AND 1946

Cause	Bituminous				Anthracite				Total			
	Number Killed	1947	1946	Killed per Million Tons	Number Killed	1947	1946	Killed per Million Tons	Number Killed	1947	1946	Killed per Million Tons
Underground:												
Falls of roof and face	363	371	0.712	0.823	68	87	1.432	1.724	431	458	0.772	0.913
Haulage	160	139	.314	.308	15	20	.316	.396	175	159	.314	.317
Gas or dust explosions:												
Local	7	1	.014	.002	2	..	.042	..	9	1	.016	.002
Major	146	27	.286	.060	25	..	.526	..	171	27	.307	.054
Explosives	15	10	.029	.022	7	7	.147	.139	22	17	.039	.034
Electricity	21	21	.041	.047	3	3	.063	.059	24	24	.043	.048
Machinery	21	24	.041	.053	..	1	..	.020	21	25	.038	.050
Shaft	5	7	.010	.016	1	1	.021	.020	6	8	.011	.016
Miscellaneous	17	21	.033	.047	4	13	.084	.258	21	34	.038	.068
Total underground	755	621	1.480	1.378	125	132	2.631	2.616	880	753	1.578	1.502
Stripping or open-cut	23	20	.055	.044	5	3	.105	.158	33	28	.059	.056
Surface	39	37	.076	.082	13	11	.274	.218	52	48	.093	.096
Total	822	678	1.611	1.504	143	151	3.010	2.992	965	829	1.730	1.654

*All figures are subject to revision.



"Get This Straight"

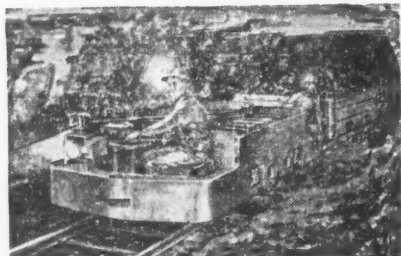
"A bowed rope is a weakened rope, Mac . . . those 'Finger Pinch' U-Bolt Clips crush and bend the rope . . . make the load *uneven* — some strands are overloaded . . . others don't carry their proper load. Results: premature rope failure . . . higher rope costs . . . lessened efficiency. Replace 'em with Laughlin 'Fist-Grip' Clips — they'll make your rope straight like *this* one, because their flat bearing surfaces give uniform pressure over the entire contact area. 'Fist-Grips' are easy to put on, too, Mac . . . even new men like yourself get 'em right the first time because they come in identical halves — you *can't* stagger 'em. Furthermore, three 'Fist-Grips' do the work of four U-Bolts, so you save time. Ask the Supply Room boys for 'Fist-Grips' . . . they prevent many a headache."

"Fist-Grip" Clips are available at your supply house. Look for the "L" trade-mark. Write for fitting catalog: Dept. 6, The Thomas Laughlin Co., Portland 6, Maine.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



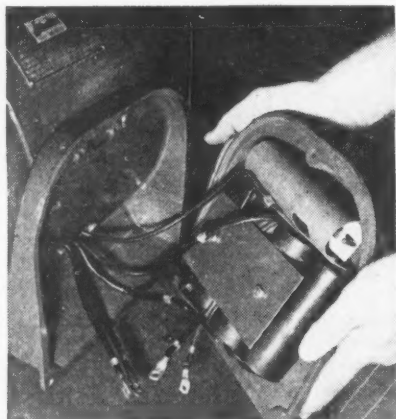


Equipment News

More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

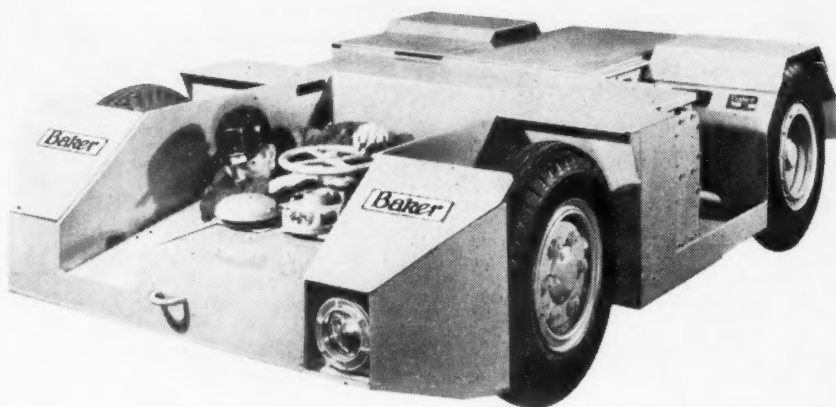
Electric Motor

A new capacitor-start single-phase squirrel-cage electric motor, said to be a long step forward over its predecessor model in many ways, has been announced by Westinghouse Electric Corp., Pittsburgh 30. It is sturdier than the former model, its windings are stronger and the bearings are pre-lubricated and require no attention for at least five years, according to the company. Starting-torque characteristics have been improved to the point where, it is stated, it can more than compete with the repulsion-start induction-run motor, which has long been used for tough-starting as-



signments such as compressors. The new motor has high torque values all the way up from standstill to full speed, something the repulsion motor cannot provide. Thus compressors can be driven by the simplest form of induction motor—the die-cast squirrel-cage machine, Westinghouse states.

A centrifugal switch of improved design manufactured under close tolerance is used on motors rated 1 to 3 h.p. inclusive at 1,750 r.p.m. and 1½ to 5 h.p. at 3,600 r.p.m. On larger ratings or special mountings, to which the switch is not readily adapted, a newly developed relay is used. The capacitors are mounted in the conduit box, a location easily accessible and also providing a lower ambient temperature said to permit the motor to withstand greater abuse in starting. A new stator winding using lap-wound coils grouped to provide the required distribution permits greater ease in winding, resulting in less mechanical abuse of insulating materials and more reliable coils. Inherent protection is available, when desired, by adding a thermoguard, responding to the temperature of the motor.



PERMISSIBLE MINE TRACTOR for operation in seams down to 30 in. high has been announced by the Baker Industrial Truck Division, Baker-Raulang Co., Cleveland 13, Ohio, as an addition to its line of battery-powered tractors for hauling men, supplies and equipment at trackless mines. The unit may be operated from either a sitting or reclining position.

Hoist-Jack

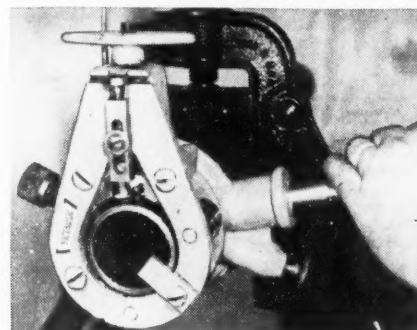
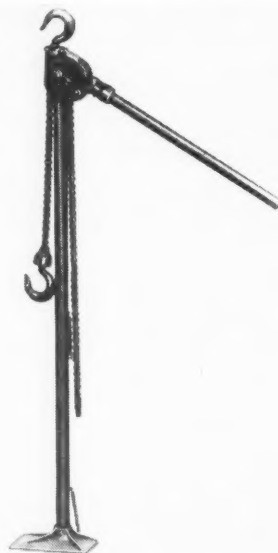
The Coffing Hoist Co., Danville, Ill., has introduced a new "Hoist-Jack," a combination hoist-and-jack complete in three pieces designed to move or lift heavy loads in shops, mines and on field jobs. The unit has a rated capacity of 2,000 lb. and weighs 23 lb. complete. Features are said to include: a hoist whose ratchet-and-pawl construction uses the smallest possible number of working parts; a "safety-load" handle designed to bend before any other parts can break; a stroke

which at the top brings the handle even with the top of the hoist frame, thus requiring very little headroom; and compactness that makes it possible to carry the unit in a tool box.

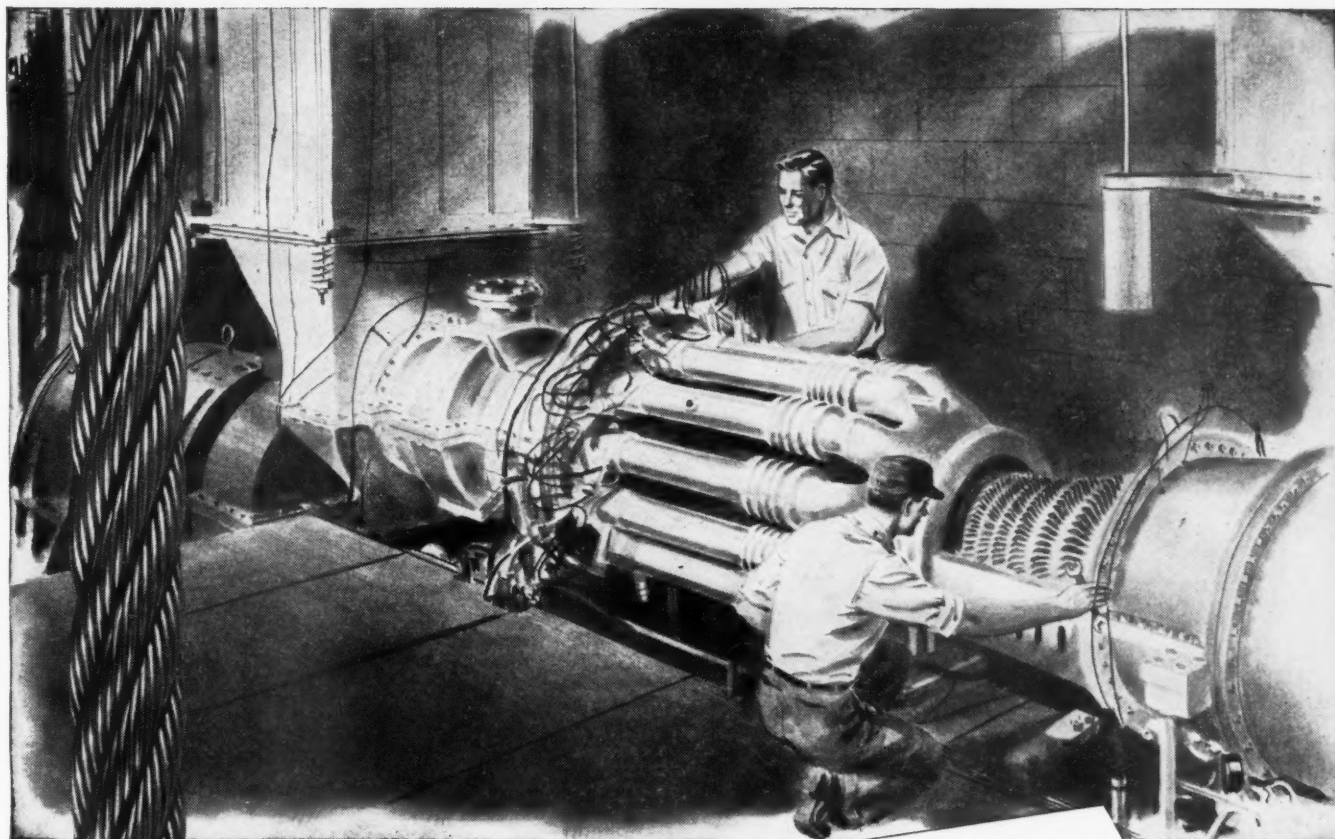
Weight of the hoist alone is 13 lb. Height of the stand is 42 in. The hoist can be used alone to lift, pull or move, or with the stand as a jack.

Pipe Groover

Victaulic Co. of America, 30 Rockefeller Plaza, New York 20, has announced a new portable automatic pipe groover that is said to easily and quickly convert plain-end pipe so



that it may be used with Victaulic couplings and fittings. The new device, known as the "Vic-Groover," may be operated either by hand or power and grooves pipe in half the



Precisionbilt LIKE A GAS TURBINE PRIME MOVER*
J&L WIRE ROPE
 PERMASET PREFORMED

Like a Gas Turbine Prime Mover*, J&L Precisionbilt Wire Rope is made of the finest materials by skilled men who have had years of practical experience. It too is an efficient mover, for J&L Precisionbilt Wire Rope handles material with economy and safety. To gain the advantage of low maintenance costs specify J&L Wire Rope on your order.

**Gas turbine prime mover, new and highly efficient, develops tremendous power with economy of space and fuel. Originally designed for locomotives, it is finding other uses as need for new sources of power arise.*

**J&L
STEEL**

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

NEW TRUCKS-



NEW Styling

Here are wide, massive trucks representing DESIGN with a PURPOSE . . . trucks combining appearance with comfort, safety, performance, economy, and ease of handling.

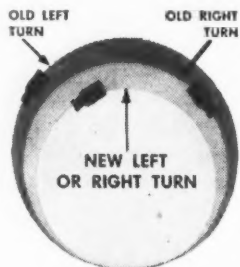
NEW Ease of Handling

Less turning space needed . . . right or left. Better weight distribution

Remarkable new ease of handling and driving is yours in these new "Job-Rated" trucks. You can turn them in much smaller circles. You can park, back into alleys or up to loading platforms with much greater ease. You get all this with a new type of steering, in combination with shorter wheelbases that accommodate full-size bodies, and the roomier, longer cabs.

You get much better weight distribution, too, with this new design.

Front axles have been moved back, and engines forward. This places more of the engine and cab weight on the front axle. Loads are more evenly distributed.



NEW COMFORT



- ① PLENTY OF HEADROOM
- ② STEERING WHEEL . . . right in the driver's lap.
- ③ NATURAL BACK SUPPORT . . . adjustable for maximum comfort.
- ④ PROPER LEG SUPPORT . . . under the knees where you need it.
- ⑤ CHAIR-HEIGHT SEATS . . . just like you have at home.
- ⑥ "AIR-O-RIDE" CUSHIONS . . . adjustable to weight of driver and road conditions.

⑦ 7-INCH SEAT ADJUSTMENT . . . with safe, convenient hand control.

ALL THIS...

and more...with the

NEW DODGE

REALLY NEW!

NEW Tractors and other High Tonnage Models!

You'll find, in these *new* high tonnage models, many *exclusive* advancements: Strong, durable metals and alloys . . . precise machining, and a much wider range of equipment. Engines have cost-reducing sodium-cooled valves, and stellite-faced exhaust valves and seat inserts. Other outstanding features include sturdy 5-speed transmissions; rugged 12" and 13" clutches; smooth, safe brakes—finest in the trucking industry.



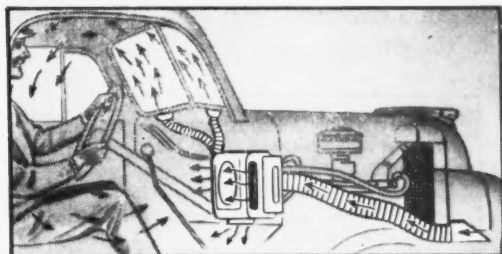
NEW "Pilot-House" Cabs with all 'round vision



Note the tremendously increased *vision* of these cabs. Windshields and windows are higher and wider. New rear quarter windows add still more to vision, and to safety.

With this increased glass area throughout, you get "Pilot-House" vision . . . in *all* directions. With welded all-steel construction, they're the *safest* cabs ever built.

NEW All-Weather Ventilation



You drive in comfort whether it's 10° below or 100° above. Available is an ingenious combination of *truck* heater, defroster vents, vent windows, cowl ventilator, and a new fresh air intake from behind the front grille. It's the *finest* "All-Weather" heating and ventilating system ever installed in a truck cab.

"Job-Rated" TRUCKS

Now on Display
SEE YOUR
DODGE DEALER

Everybody's happy

when coal is freezeproofed

with WYANDOTTE
CALCIUM CHLORIDE

DEALERS are dissatisfied when coal arrives frozen in the car. They know that the extra time required to unload it will put them behind on their delivery schedules.

But they're pleased to find coal freezeproofed with Wyandotte Calcium Chloride. This means that it will come out of the car easily, quickly and uncracked. And you'll benefit by their friendly feeling.

Wyandotte Calcium Chloride is economical. You need no special equipment to handle it for freezeproofing. So there's every reason for giving your dealers a break this winter.

Let us tell you more about the advantages of freezeproofing coal with Wyandotte Calcium Chloride. Just send along the coupon.

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division, Dept. 1776
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

Name _____

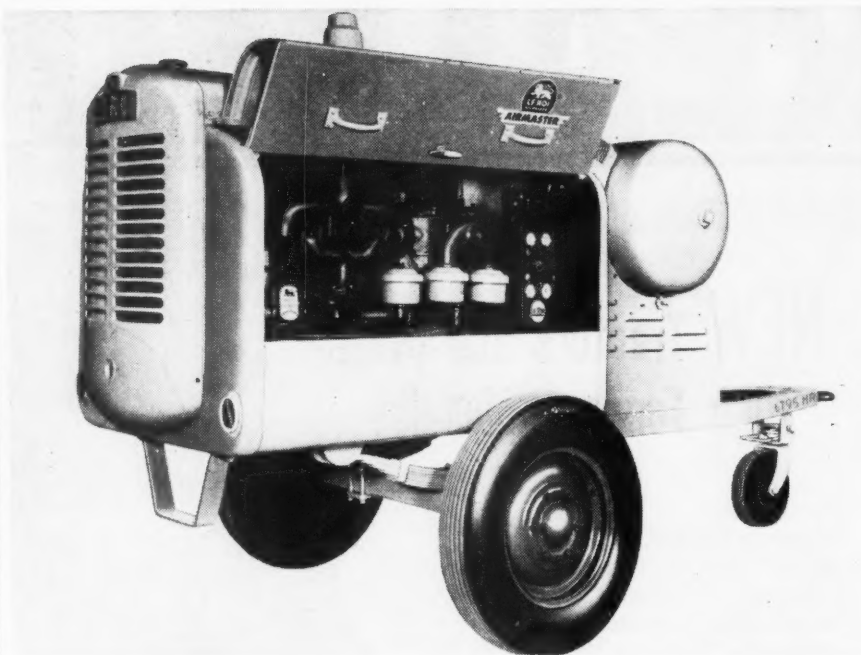
Address _____

Title _____

 **Wyandotte**
REG. U. S. PAT. OFF.
CALCIUM CHLORIDE

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division, Wyandotte, Michigan

150



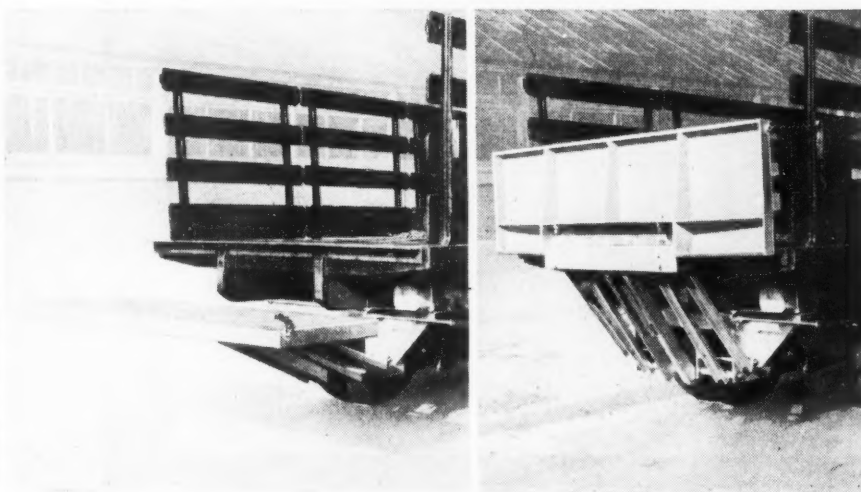
NEW LE ROI 85 Airmaster compressor announced by the Le Roi Co., Milwaukee 14, is powered by a Le Roi Model D201 valve-in-head engine and is available in pneumatic-tired or skid mountings. The compressor, integrally built into the engine block, is liquid cooled and is automatically controlled by an "Econotrol" unit according to air demand. Electric starting is standard and construction is consistent with the Airmaster line.

time and with half the effort required for threading pipe, according to the company. Cutting perfect grooves to the proper depth automatically, the "Vic-Groover" is lightweight and is easily carried to isolated locations. It is available in sizes to accommodate pipe from $\frac{3}{4}$ to 4 in.

Fire Extinguisher

A new splash-proof "Foamite Fire-foam" fire extinguisher for vehicle service has recently been announced by American - LaFrance - Foamite Corp.,

Elmira, N. Y. The sealed stopper built into the top that prevents the chemical from mixing until needed is released by a twist of the wrist to make the extinguisher ready for action, according to the manufacturer. Except for the carrying strap, the new unit is said to be similar to the Foamite Fire Department type carried on fire engines. It reportedly produces a fire-killing chemical foam equal to 10 times its own capacity and stops oil and gasoline fires and prevents reflashing. The stream range is said to be 35 to 40 ft.

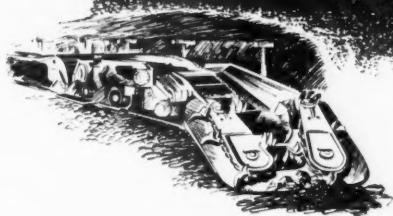


TO SPEED TRUCK LOADING and cut labor, the Day Co., 306 West 69th St., Chicago 21, offers this hydraulic tail-gate loader said to be capable of raising or lowering loads up to 1,200 lb. The lift platform remains level (left) in traveling the full distance from ground to truck floor and swings up to act as a tail gate (right) when the truck is on the road. The unit is said to fit most standard $1\frac{1}{2}$ -ton trucks and is available in either power-takeoff or hand-pump models.

January, 1948 • COAL AGE

TO KEEP THEM
WORKING DOWN UNDER
USE
WHITNEY

**UNIVERSAL
MINING CHAIN**



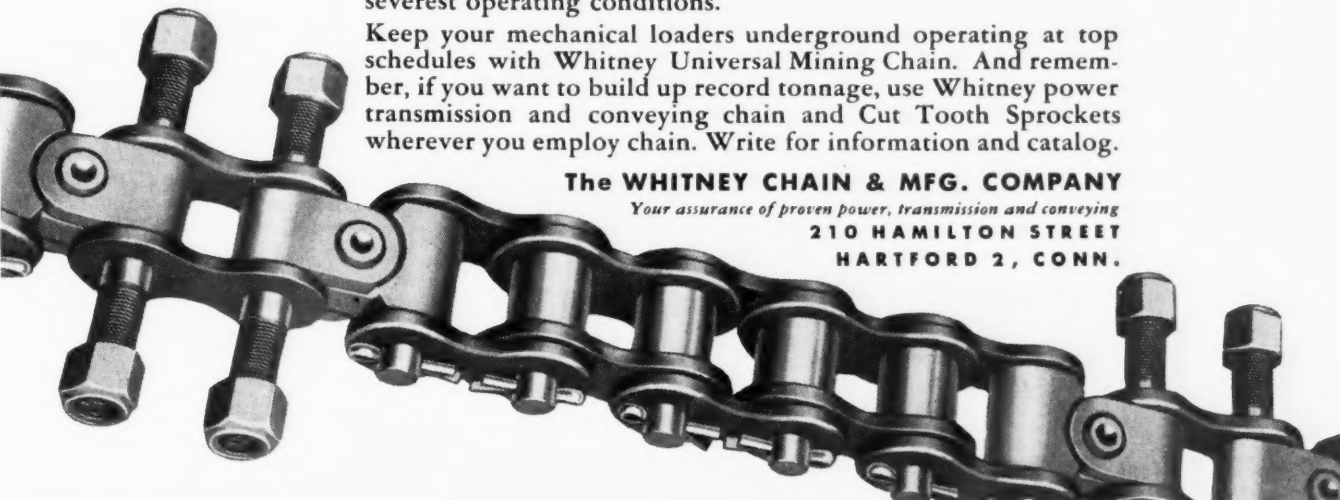
Idle loaders waiting for chain repairs can mean a serious loss of tonnage. Yet you can avoid most of your loader chain failures by replacing worn, inefficient chain with Whitney Universal Mining Chain.

This tough, rugged chain is especially designed and constructed to take the hard use of coal mining. Hardened alloy steel link parts, machined flight threads and heavy heat-treated universal joints assure long life under the severest operating conditions.

Keep your mechanical loaders underground operating at top schedules with Whitney Universal Mining Chain. And remember, if you want to build up record tonnage, use Whitney power transmission and conveying chain and Cut Tooth Sprockets wherever you employ chain. Write for information and catalog.

The WHITNEY CHAIN & MFG. COMPANY

Your assurance of proven power, transmission and conveying
**210 HAMILTON STREET
HARTFORD 2, CONN.**

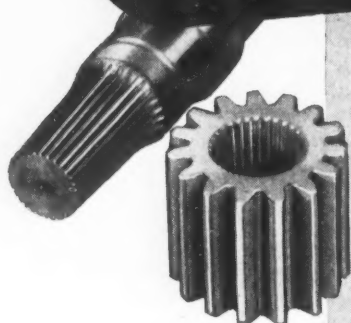


QUALITY

IN MINE GEARS AND PARTS



**What is YOUR
MEASURE of it?**



**33-1/3% TO 50%
GREATER STRENGTH
AND LONGER LIFE
WITH "GENUINE
PITTSBURGH GEAR"
TAPER SERRATED
SHAFTS AND PIN-
IONS. SEND
FOR DETAILS.**

Do you judge **QUALITY** by performance? Trouble-free operation? Economy? **GENUINE PITTSBURGH GEARS** give you all these.

As gear "specialists" for over 30 years we combine engineering "know-how" with modern heat treatment to produce gears for long, satisfactory service. From finest raw materials to final protective finish and packaging **GENUINE PITTSBURGH GEARS** meet strictest ideas of **QUALITY**. Performance records prove it. Specify them.

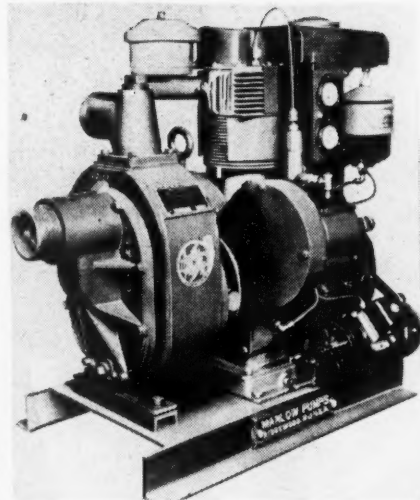
There's a **PITTSBURGH GEAR** Distributor near you with ample stocks. See him for all your gearing needs, or write us.

New Price List
on Request



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AND MACHINE COMPANY | 27th & Smallman Streets
PITTSBURGH 22, PA.

SPECIFY GENUINE PITTSBURGH GEARS



220-G.P.M. SELF-PRIMING centrifugal pump is said to be the first small diesel-powered pumping unit available. The single-cylinder "Aircooled" Sheppard motor is rated at 3 1/2 continuous hp. at 1,800 r.p.m. and is equipped with electric starting if desired. One gal. of domestic fuel oil will pump 36,500 gal. of water, the company says.

Brush Kit

Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio, has announced production of a new carbon-brush kit No. 9 for small motors. By use of a container made of light durable transparent plastic material, the contents of each compartment are visible from any angle.

The brushes, springs and wicks are identified by a code number stamped on the cover directly over each compartment containing the part, making it very simple to make the proper selection and also facilitating the ordering of refills. To keep this assortment flexible, it is said, all brushes are 1 in. long and can easily be reduced to the proper length by grinding, filing or sawing. The round brushes in the kit range from 5/32 to 3/8 in. in diameter and square and rectangular brushes from 5/32 in. square to 1/4x5/16 in. Four sizes of springs and five sizes of oil wicks are included. The contents of the kit total 168 brushes, 40 springs and 10 wicks.

Car-Spotting Hoist

A new light-duty or "Junior" car-spotting hoist has been announced by the Flood City Brass & Electric Co., Johnstown, Pa. Designed for operations not requiring the full capacity of the company's "regular" car spotter, the unit is said to be similar in design to the heavier unit, except that no intermediate shaft is used and the reducer is mounted directly on the drum shaft with a clutch on the opposite side of the drum from the reducer.

The reducer is rated for a 5-h.p.

RIGHT-ANGLE LOADING for *HEAVY DUTY.*



Splits the load in two!

Rollway Right-Angle-Loaded Bearings split all loads into pure thrust and pure radial . . . and carry each load at right angle to the roller axis. Hence, compound loads, oblique loads and their resultants do not bear upon one bearing alone.

This prevents wedging of rollers and pinch-out. Reduces roller end-rub, wear-back and rubbing friction. Cuts risk of shut-downs . . . cuts cost of maintenance and replacements.

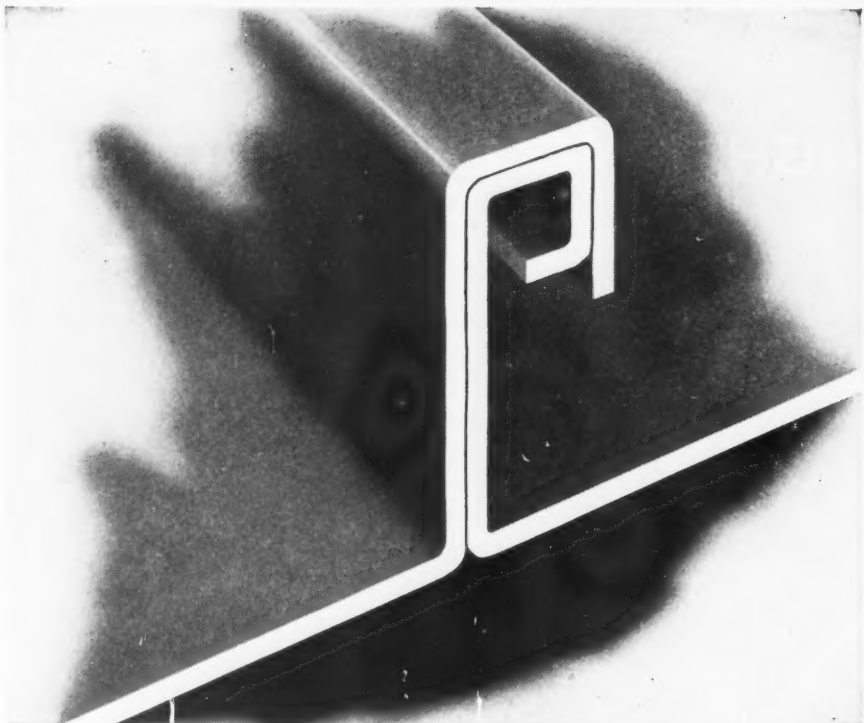
ROLLWAY BEARING COMPANY, Inc.
SYRACUSE, N. Y.

ROLLWAY

RIGHT-ANGLE-LOADED

BEARINGS

OFFICES IN: PHILADELPHIA • BOSTON • PITTSBURGH • CLEVELAND
DETROIT • CHICAGO • MINNEAPOLIS • HOUSTON • LOS ANGELES



This Joint Gives Buildings "Old Age Benefits"

Here is simple, low-cost insurance against the time when ordinary buildings begin to sag and show their age. The patented, Armco joint withstands expansion, contraction and unequal settlement. It keeps Standard STEELOX Buildings trim and youthful.

You'll also reap immediate benefits. With the revolutionary STEELOX method, the jointed panels provide both structural support and a finished surface. Erection is simplified, appearance improved and weathertight construction assured. Unskilled workmen quickly join the panels into a sturdy, maintenance-free structure.

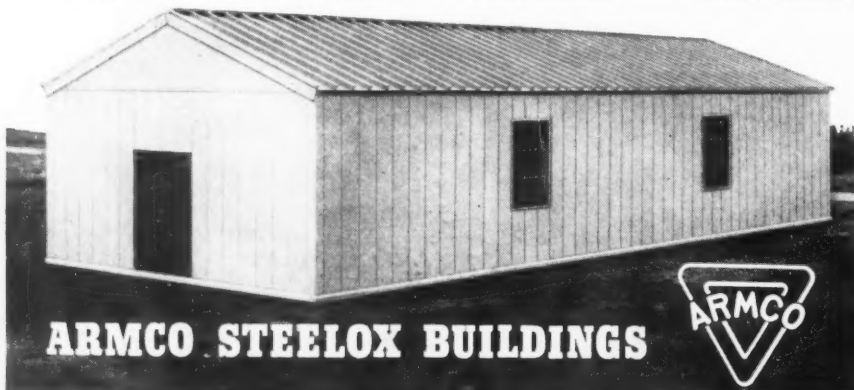
There are other advantages in

using STEELOX Buildings. They are made of Galvanized ARMCO PAINTGRIP Steel and can be painted immediately or left unpainted. STEELOX Buildings have the long life and low upkeep of a permanent structure, yet when necessary they can be quickly dismantled and re-erected at another site without loss of material. All parts are uniformly strong and the all-steel construction is an excellent fire-barrier.

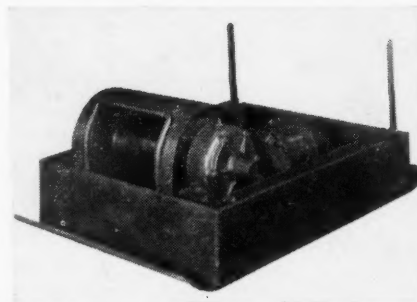
STEELOX Buildings are prefabricated in a wide range of standard sizes to meet your requirements. Write for complete data. Armco Drainage & Metal Products, Inc., 2385 Curtis Street, Middletown, Ohio.

Check list for STEELOX Buildings

- | | | | |
|----------------|----------------|---------------|---------------------|
| ✓ Scale Houses | ✓ Time Offices | ✓ Cap Storage | ✓ Blower Houses |
| ✓ Tool Houses | ✓ Garages | ✓ Head Houses | ✓ Engine Houses |
| ✓ Washrooms | ✓ Lamp Houses | ✓ Pump Houses | ✓ Utility Buildings |



ARMCO STEELOX BUILDINGS

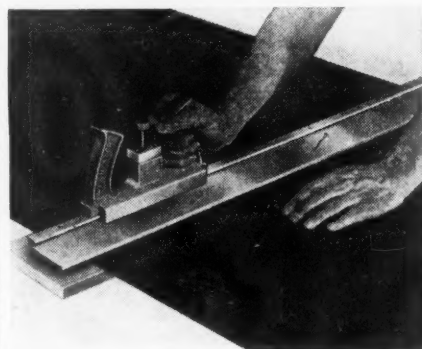


motor and dimensions of the unit are: 60 in. long, 36 1/4 in. wide and 13 in. high. The unit is rated at 4,000-lb. rope pull at a rope speed of 35 f.p.m., according to the company.

Belt Cutter

A new-type belt cutter developed by the Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, is said to simplify cutting belts up to 60 in. wide and 1 1/2 in. thick. The new cutter, called the No. 300 "Alligator" wide-belt cutter, is made up of two elements, the head carrying the blade and a T-shaped base or guide rail.

To use the cutter, it is only necessary to square the base up with the center line of the belt, according to



the manufacturer. The base is then nailed to the belt and the cutter is pushed across. Each cut is made about 1/8 in. deep and the screw then is turned to lower the blade another 1/8 in. With several rapid cuts a belt can be cleanly and squarely cut, it is said. The base is made in four lengths for 24-, 36-, 48- and 60-in. belts, each base being 4 in. longer than the width of belt on which it is designed to operate, to give sufficient guide to the head when the blade clears the outer edge of the belt.

Winch

The new CP utility winch, developed by the Chicago Pneumatic Co., 6 East 44 St., New York 17, is said to feature a new precision control that eliminates the bouncing and jerking of loads, with loads up to a ton and as far away as 1,100 ft. being handled with ease and precision. Another feature cited for the CP winch is a combination cathead and drum ar-

PRE-TESTED 18 TIMES FOR BETTER PERFORMANCE

The Quaker testing laboratory is on the job day and night, maintaining top quality . . . continuously working in advance of industry's demand for the best in belting, hose, packings.

Each batch of rubber is carefully compounded and mixed in miniature masticators shown above. After mixing, compounds must pass a series of severe tests simulating actual working conditions. That's your assurance of peak performance when Quaker products are on the job. Strict laboratory control, coupled with 62 years of development know-how keep Quaker products out front for efficient operation.

And for quick, reliable service, call your nearest Quaker distributor. He and the Quaker sales engineer form an efficient team, ready to offer the right recommendations on Quaker pre-tested belting, hose, packings . . . for all purposes.



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PHILADELPHIA 24, PA. • New York 7 • Cleveland 15 • Chicago 16 • Houston 1
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QUAKER PACIFIC RUBBER COMPANY • San Francisco 5 • Los Angeles 21

QUAKER RUBBER PRODUCTS
custom made for every industrial use

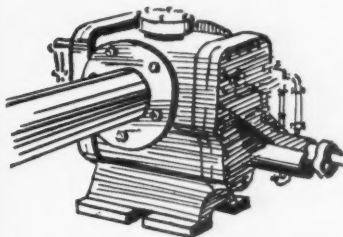
QUAKER PACKINGS IN INDUSTRY

Quaker products are tried, tested, proved for better performance in industry everywhere.



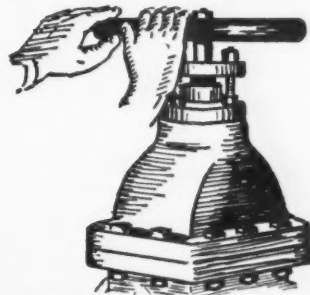
PUTS THE FREEZE ON LEAKS

Upon recommendation of a Quaker sales engineer, a midwest creamery installed Quaker Daniell's P.P.P. Packing on their ice machines. Result? The creamery obtained the tight sealing action so essential, saving time, cutting costs. There are no leaks here!



"TRIPLE THE SERVICE"

Here's how one large eastern plant eliminated an asphalt pump packing problem. "... The longest service ever received from other packings was 30 days, but Quaker Copperpac and #175 Ebonite packing have been in use for over 3 months and still going strong."



SAFETY FIRST WITH PETRO-PAK

One well-known eastern refinery found the right answer for packing 4" stuffing boxes when it put Quaker #1675 Petro-pak to the test. Specially-designed for the petroleum industry, Petro-pak passed the test with flying colors . . . provided safe, leak-proof sealing action.

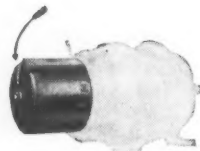


SPEED PRODUCTION with STEARNS MAGNETIC disc BRAKES

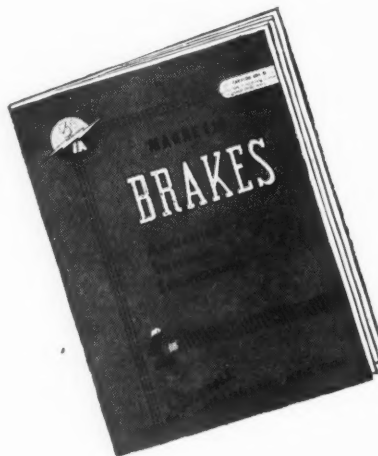
Reduce your production costs by eliminating expensive time lost in coasting motors and machinery. In sizes up to torques of 500 lbs. or the equivalent of 100 hp. at approximately 1000 rpm. for AC or DC current; also fractional horsepower brakes for 1/6, 1/4, 1/3, 1/2, 3/4 hp. applications for AC . . . floor or motor mounting . . . horizontal or vertical applications.

For the answer to your problems involving effective retarding of motors or machinery, whether for one or a sequence of controlled stops, consult Stearns Magnetic Brake Division, Milwaukee 4, Wis.

Ask for Bulletin 604-E.

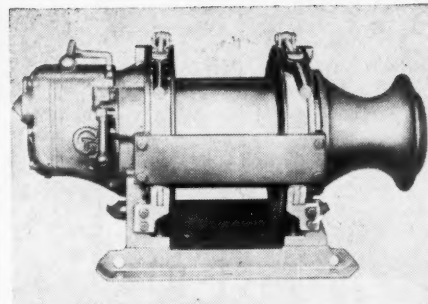


The magnetic brake with the lining wear indicator and manual release—distinctive, original.



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MAGNETIC MFG. CO.
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PULLEYS
CLUTCHES
BRAKES
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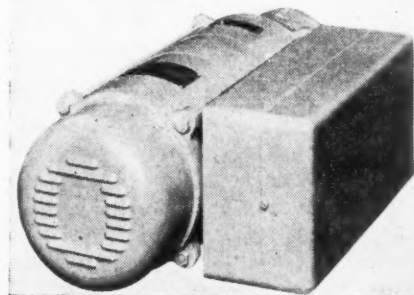
rangement, by which the cathead can be operated independently of the cable drum. Thus a load can be held aloft by the drum cable and maneuvered by the cathead rope.

The CP winches can be furnished with air, electric or gasoline power. The air motor is interchangeable with any standard flange-mounted 7½-hp. electric motor, simply by removing six cap screws. Controls are said to be limited to a clutch lever and brake lever, with a safety lock for use in case of power failure. Drum speed is 125 f.p.m. at air pressure of 80 lbs. per square inch.

Electronic Amplidyne

A new electronic amplidyne consisting of a high-gain balanced d.c. electronic amplifier and a motor amplidyne, useful in many types of motor control where precise regulation of current, voltage, and speed is necessary, has been announced by the Motor Divisions, General Electric Co., Schenectady, N. Y. Designed for use as a regulated adjustable-voltage power supply for d.c. motors up to 1½ hp. and as a regulated exciter for larger adjustable-voltage drives up to 200 hp., the new equipment has an output of 1½ kw., 250 volts. It is arranged for use on either a 220- or 440-volt, 3-phase, 60-cycle power supply.

The electronic amplidyne makes possible a speed range of 20 to 1 or greater and is said to maintain speed closely at any setting, regardless of load conditions. It assures smooth, rapid acceleration and reduces starting shock on the driven machine by means of current-limit control of acceleration and stalled current, according to the company. Quick stopping without undue stress to motor or driven load is provided by suicide braking utilizing current limited regeneration. The equipment is said to



... We Shook Out the Pickpocket's Dust Pockets



to
save this plant

\$6000⁰⁰
Yearly

In the plant shown here, 25 tons of dust a day, produced from wood-working operations, could have formed dust pockets which would have ruined efficiency as well as created a hazard.

But — a Pangborn dust control system was installed to collect and dispose of the dust. As a result, the shop area "is remarkably clean and clear of dust". The wood waste, removed from the air, is deposited

directly into storage hoppers for disposal. And, the air, after cleaning, returns to the working area, resulting in a saving in heating expense alone of about \$6,000.00 a year.

A "Dust Pocket Survey" of your plant may reveal similar opportunities to turn dust losses into profits by removing dust (and reclaiming it, if it's valuable) from light-stealing, efficiency-reducing, maintenance-increasing dust pockets. Such a survey

— by experienced Pangborn engineers — costs nothing. And ask for free 28-page Bulletin 909A, giving complete story on Pangborn equipment which has successfully solved dust problems in over 9000 installations. Address Pangborn, world's largest manufacturer of dust control and blast cleaning equipment at 288 Pangborn Boulevard, Hagerstown, Maryland.

Pangborn

DUST CONTROL

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

TURNING DUST LOSSES
INTO PROFITS

SuperDuty Coal Washing TABLES DO DOUBLE DUTY

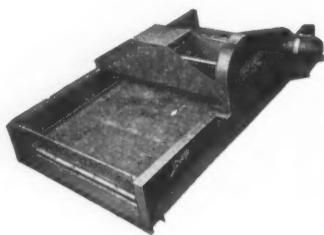


Not only do SuperDuty tables wash your coal most efficiently, but they separate from the coal any foreign substance of different specific gravity.

The separative action is substantially improved over conventional methods by SuperDuty's exclusive diagonal deck which places approximately 75% more working riffles in the natural path of the separative action. This so fans out the bed that accurate division of products is assured.

So efficient is the SuperDuty that many operators are finding it profitable to process low grade deposits, culm banks or waste piles from other coal cleaning machines.

For full information, write for Bulletin 119.



FOR SCREENING ECONOMY

The Leahy Vibrating Screen possesses an uncanny ability to do a job right—and in record time. It screens wet or dry, using screen cloth or perforated plate. Excellent for dewatering or desanding. Range from 2" to finest mesh. Ask for Bulletin 14-H.

THE DEISTER ★
CONCENTRATOR
COMPANY

903 Glasgow Ave. • Fort Wayne, Ind., U.S.A.

**CONCENTRO
PRODUCTS**

★ The ORIGINAL Deister Company ★ Inc. 1906

satisfactorily maintain speed on overhauling loads where the motor is required to absorb power and act as a brake during part of the loading cycle.

Safety Goggles

Two new safety goggles are now available from the American Optical Co., Southbridge, Mass. The new rubber-frame 705 "Super-Vent" goggle, specially designed for work in hot and humid atmospheres where chemical and dust hazards exist, features a nosepiece with an inhalation and exhalation valve that is said to prevent fogging and steaming of the goggle's large wide-angle acetate single lens. As the wearer breathes, air is swept through the chamber, removing moisture on the inner lens surfaces before it can fog. The goggle frame is molded from non-irritating natural rubber, and conforms to the face contours for an airtight fit that prevents any acid or dust leakage, it is said.

The new spectacle-type Series F9200 goggle, with a "Ful-Vue" acetate frame, is said to provide a more exact fit, increased comfort and better appearance. It features a key-hole bridge that is strong and sturdy but light in weight, and for added protection and comfort the bridge has a slight amount of face form, according to the company. The goggle is available with either "6 Curve Clear" or "Calobar Super Armorplate" lenses.

Electric Motor

Electric Machinery Mfg. Co., Minneapolis 13, Minn., has announced a two-pole squirrel-cage induction motor as an addition to its "Heavy-Duty" line, for such high-speed applications as boiler-feed and centrifugal pumps, compressors and blowers. The motor is rated from 200 to 700 hp. at 3,600 r.p.m.; NEMA Class B starting (normal torque, low current), favorable for across-the-line starting. Features are said to include drip-proof construction and a fabricated steel frame.

Fire Extinguisher

A new 4-lb.-model dry-chemical fire extinguisher, known as the Ansul 4, has been announced by the Fire Extinguisher Division, Ansul Chemical Co., Marinette, Wis. The unit, 19½ in. long and 3½ in. in diameter, is said to be designed for effective use by inexperienced operators and to be quickly recharged on the spot. Typical of the Ansul dry-chemical line, the new extinguisher is reported to be suitable for extinguishing fires in flammable liquids, gases, solids and electrical equipment, as well as ordinary combustibles. The extinguishing agent is said to be non-toxic, non-corrosive, non-abrasive and a non-conductor of electricity.



... yet this TRANSITE PIPE drainage line has carried corrosive acid mine waters for over 11 years

Here is another example of the exceptional corrosion resistance of Transite* Pipe in mine service.

The Transite drainage line pictured here was installed more than 11 years ago in the Packer # 2 mine of the Weston-Dodson Coal Company at Lost Creek, Pennsylvania. Since then, it has been continually carrying corrosive acid mine waters. Today, it is still on the job . . . still saving many dollars in maintenance and replacements.

Such performance is not unusual. Our records contain many examples of Transite drainage lines that have served for years where the pipe formerly used had to be replaced every few months. Some of these "old timers" have even outlived the mines in which they were originally installed and have been moved to new locations to continue their long-term trouble-free service.

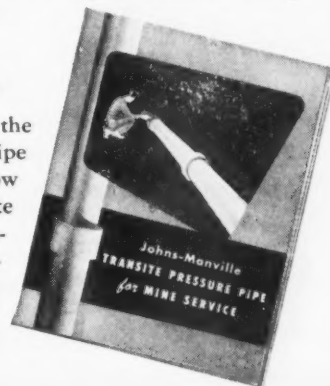
In other types of mine service too, this asbestos-

* Reg. U. S. Pat. Off.

cement pipe saves money for coal operators. For water supply lines, Transite offers the advantage of an unusually high carrying capacity—helps assure low pumping costs. Transite is also providing important economies for fire prevention ducts, for spray and return lines from condenser cooling towers, and for many other services where a tough, durable, easily installed pipe is required.

SEND FOR FREE BOOKLET

For further details, send for the booklet "Transite Pressure Pipe for Mine Service." It tells how Transite can help you eliminate frequent replacements and reduce your pipe line maintenance. Write Johns-Manville, Box 290, New York 16, N. Y. for your copy.



Johns-Manville TRANSITE MINE SERVICE PIPE

the **DUFF-NORTON PIN TIMBERING JACK**



- ★ FACILITATES FACE TIMBERING
- ★ CUTS TIMBER COSTS—SAVES TIME
- ★ GIVES INCREASED **SAFETY**

Pin timbering—new and efficient method of face timbering—utilizes Duff-Norton Pin Timbering Jacks for supporting cross-bars in working places, as illustrated above. Jacks are set on pins 1½" in diameter and 18" long, which are placed in rib holes 2 feet from the bottom so that 3" or 4" protrude. Pins serve as rests for the jacks and transfer the load to the rib. Write for descriptive literature which gives complete data on Pin Timbering, and jacks required for installing this face timbering method in your mine.

See Your Local Industrial Distributor

Write for Literature

THE DUFF-NORTON MANUFACTURING CO.
The House that Jacks Built • PITTSBURGH 30, PA.
THE WORLD'S OLDEST AND LARGEST MANUFACTURER OF LIFTING JACKS



Welders

A new and smaller "Flexarc" a.c. series of welders has been announced by the Westinghouse Electric Corp., Pittsburgh 30, Pa. A strong, compact, streamlined case and a well-arranged interior with reactor and transformer built around high-permeability "Hipersil" steel cores are features of the new line, according to the company.

Called "The 65 Line," for the open-circuit voltage, these new welders are said to incorporate the latest features for high arc stability in both the lowest and highest current ranges of the five output ratings—200, 300, 400, 500 and 300/600-duplex amp. Built-in low-voltage control assures high efficiency in the low-current ranges and built-in capacitors provide a high power-factor and economical full-rated operation, it is stated. Natural ventilation, a movable core reactor operated by a single bell-crank current-adjusting mechanism are said to assure minimum maintenance and attention. To reduce over-all size and maintain uniformly high operating efficiency, fan cooling is provided in the 500-amp. ratings.

Magnetos

American Bosch Corp., Springfield 7, Mass., has announced a new series of magnetos especially adapted to small tractors and small and medium industrial engines. This new MJH series is available in one-, two-, four- and six-cylinder styles. Mechanical strength and excellent electrical characteristics are cited by the manufacturer. MJH magnetos are available in vertical-flange and base-mounted types, with or without standard American Bosch ICA or ICB impulse couplings and may be had in radio-shielded versions.

Silicone Oils

Dow Corning Corp., Midland, Mich., now offers DC 710 silicone oils especially developed for high-temperature lubrication—10 to 500 deg. F. (minus 12 to 260 deg. C.). A variation of this oil (DC 710G) is said to provide excellent lubrication and protection for mechanisms continually exposed to heat, high humidity or weather. DC 710R—another variation—permanently lubricates such sealed-in precision devices as clocks and instruments, according to the company, which also states that DC 710 can be used as a high-temperature bath and as a high-temperature hydraulic fluid. The DC 710R version includes a corrosion inhibitor, while DC 710G contains colloidal graphite.

Properties accounting for the usefulness of DC 710 silicone oils, according to Dow Corning, include: heat stability to 500 deg. F.; resistance to oxidation, freedom from gumming, low volatility, water repellency and good lubricity at medium to light loadings.

DO YOUR EXCAVATING *and* MATERIAL HANDLING JOBS *Faster for Less*

with a

LIMA CRANE, SHOVEL OR DRAGLINE

Owners and operators alike are enthusiastic about the fast digging cycles, low cost of maintenance, ease of operation, and exceptional fuel and lubrication economies of LIMA shovels, cranes and draglines. Their superior performance in all classes of work is a topic of conversation with users who make it their business to know about the fine points of all makes of shovels, cranes and draglines. This comparison has resulted in a steady increase in the number of LIMAS in quarries, coal and metal mines, gravel pits, brick plants, timber and construction work of all kinds. It is convincing proof of LIMA'S superior design and performance. The little extra that you invest for the best will pay extra dividends in lower upkeep, fewer delays and greater output. Insist on the best, insist on LIMA.

LIMA SHOVEL AND CRANE DIVISION

LIMA-HAMILTON CORPORATION

LIMA, OHIO, U.S.A.



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Niles Tool Works Co.
Hamilton, Ohio

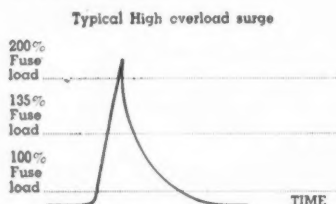
STOP UNNECESSARY FUSE

BLOWING

INSTALL PIERCE *Balanced Lag* RENEWABLE FUSES

Exclusive Features, developed by Pierce engineers, dissipate heat by:

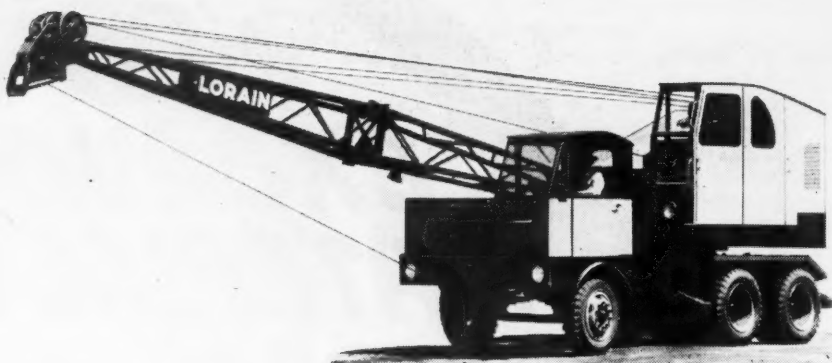
1. Link Design
2. Screen Ventilation



NOTE: The elapsed time at 200% fuse load is a few seconds, but at 135% load may be many minutes.

Pierce Balanced Lag fuses concentrate additional lag in the safe overload range, from 100% to 200% load, where lag is needed to prevent unnecessary fuse blows.

FREE: Balanced Lag Link to inspect and test. Specify amperage, voltage.



Crane Control

"Dual control," a new feature combining the between-jobs mobility of its high-speed Moto-Crane and all the on-the-job advantages of self-propelled units, has been announced by The Thew Shovel Co., Lorain, Ohio. It may be installed on any Lorain Model TL-20 mounted on a standard 4x4, 6x4, or 6x6 rubber-tired Moto-Crane carrier, which utilizes the car-

rier engine and automotive propelling and steering mechanism for traveling to the job at speeds up to 33 m.p.h.

Once at the job, the machine can be converted into a self-propelled unit within five minutes, with on-the-job travel (1 to 7 m.p.h.) powered by the turntable engine only. Steering is controlled by air power. When the job has been completed, a five-minute adjustment reconverts the machine for carrier operation.

Mercury Switch

Mercontrol, Inc., New York 7, has announced new 5-, 10-, 15-, and 20-amp. mercury switches, said to be hermetically sealed by a patented process of fusing metal to ceramic and designed for safe and hazard-free operation in atmospheres where switch-sparking constitutes a danger. They provide mercury-to-mercury contact without arcing, pitting or burning—and will operate at 110 and 220 volts a.c. or d.c., in an ambient temperature of 100 C.—according to the company.

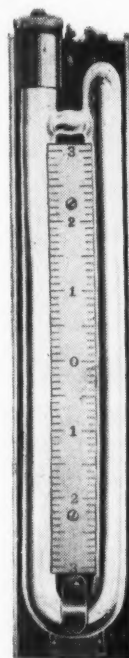
Only 1½ in. long, ½ in. in diameter, these switches may easily be installed in standard "cartridge-fuse" holders. Mercontrol switches are also available in a miniature unit: 1 in. long, ½ in. in diameter.

Insulating Varnish

Synthite AJR-7 clear-baking varnish, said to be a new, moderately priced, bakelite-base, all-purpose insulating varnish, for use on all types of wound coils, has been announced by John C. Dolph Co., Newark 2, N. J. Synthite AJR-7 can cure rapidly and completely at temperatures lower than those required for most varnishes of a similar type, according to the company, and is especially adapted for use on all modern types of coated magnet wire such as Formvar, Formex, nylon and glass, providing a build-up heavier than that afforded by many previously formulated thermo-setting varnishes. It can be applied by either atmospheric dip

or vacuum impregnation and will produce excellent results whether baked under infra-red or in conventional gas or electric-heated ovens.

ATTENTION! Ventilation Engineers



ONE PIECE Glass U Water-Gauge

Sizes:

**4" Graduation
6" Graduation
12" Graduation**

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Descriptive Literature

Also mfrs. of
Anemometers and
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Davis Instrument Mfg. Co., Inc.
513 E. 36th St. Baltimore, Md.

FLASH-DRY SAMPLES

TO DETERMINE MOISTURE CONTENT



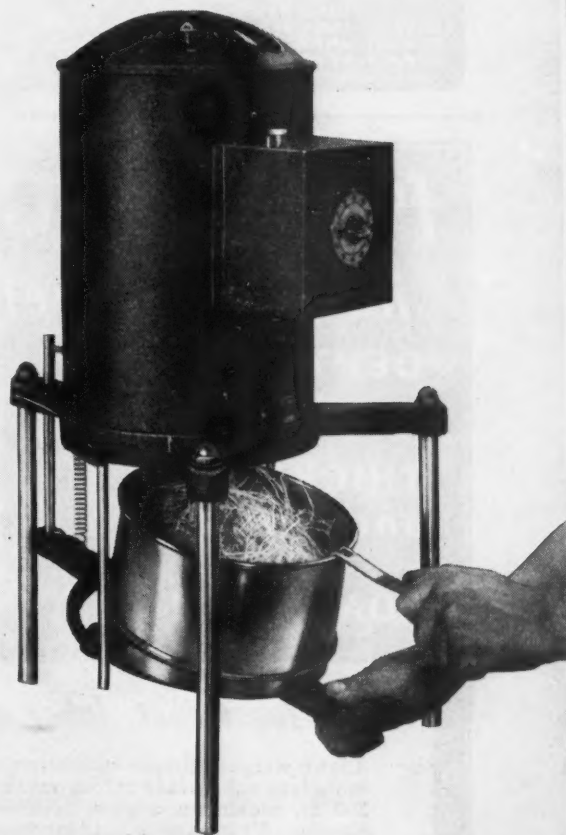
A complete line of Dietert-Detroit Moisture Tellers is available for the rapid, accurate moisture determination of such substances as chemicals, foods, fabrics, grains, sands, fuels, clays, semiliquids and others.

Model 275 is designed for materials not sensitive to drying temperatures. It has a drying pan 5" in diameter holding up to 100 gram samples.



Model 275T is used for all substances, the testing of which requires precise temperature control. It may be used as a flash drying oven for liquids or small samples.

Model 278T is used for bulky samples up to 500 grams. It is ideal for handling a large number of liquid samples and for drying materials in the wet screen analysis. The pans are 8" in diameter and may be from 1" to 4" in depth.



Write for descriptive folder and prices.

HARRY W. DIETERT CO.

9330 ROSELAWN AVE., DETROIT 4, MICHIGAN

SAND • MOLD • MOISTURE • SULFUR • CARBON

THE KEY TO BEARING ECONOMY

PROMET
THE ENGINEERED BRONZE

A SPECIFIC FORMULA FOR EACH APPLICATION

**AXLE BEARINGS • JOURNAL LINERS
BUSHINGS • WEARING PARTS**

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GOODMAN JOY
WESTINGHOUSE JEFFREY
SULLIVAN EQUIPMENT

WRITE FOR FREE FOLDER.

THE AMERICAN CRUCIBLE PRODUCTS CO., 1307 Oberlin Ave., Lorain, Ohio, U. S. A.
Prompt deliveries can usually be made from stocks maintained at

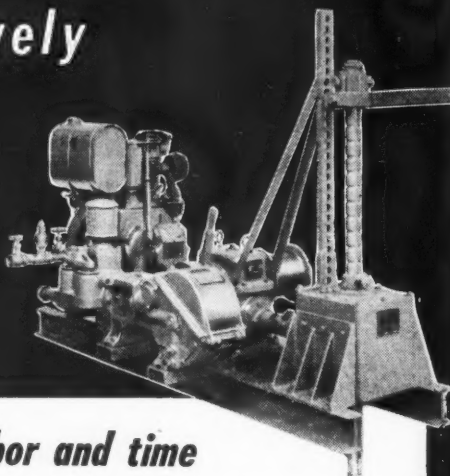
BECKLEY, W. VA., The Universal Supply Co. 1207 S. Kanawha St. Phone 7307	DENVER, COLO., Urquhart Service 16th St. at Blake Phone Main 0331
LORAIN, OHIO, The American Crucible Products Co. Phone 5983	MT. LEBANON, PA., J. E. Nieser 720 Roselawn Ave. Phone LE 9876
ALTON, ILL., Frank E. Rhine, 623 Main Ave. Phone 3 8624	WHEELING, W. VA., Pellish & Company 110 111 Fidelity Building Phone 1795
BIG STONE GAP, VIRGINIA, C. P. Cawood Box 290	WILLIAMSON, W. VA., Williamson Supply Co. Phone 1200
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Know Positively

**DEPTH of
overburden**

**THICKNESS
and quality
of
COAL SEAM**



for least cost, labor and time

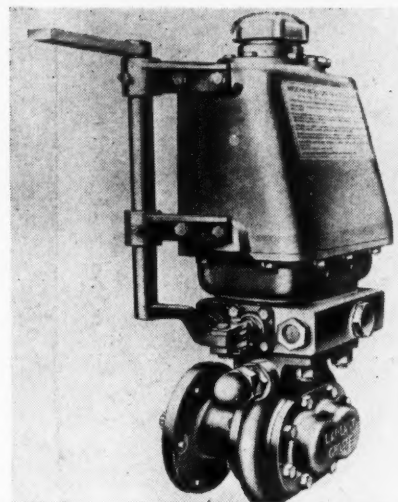
Light weight, simple operation, Acker Drills furnish complete subsurface information, accurate cores, from 300 ft. maximum depths. No feed screws or feed gears. Sturdy. Few parts . . . ideal for work in isolated locations. Easy to move over rough terrain; choice of mountings—truck, trailer or drag. Operate diamond, alloy or steel shot bits. Send for fully descriptive circular.

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ACKER DRILL CO.,

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**ACKER ROTARY
CORE DRILLS**



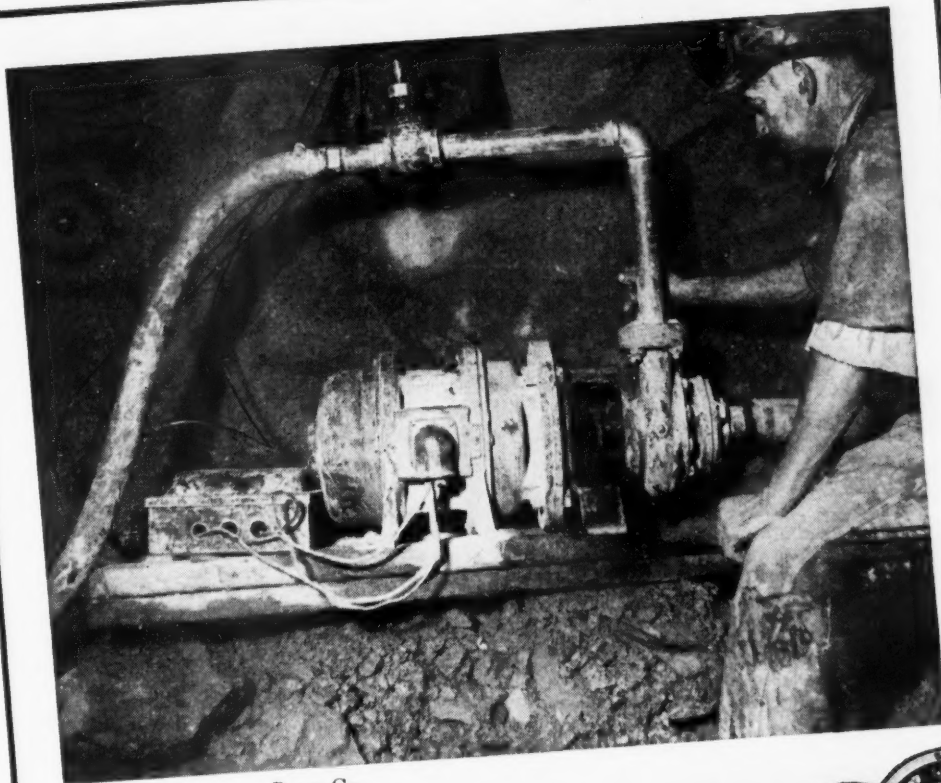
Hydraulic Units

LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, has announced a complete new line of hydraulic products including hydraulic pumps, motors, valves, cylinders and a 3-in-1 power unit that incorporates in one design a pump, control valve and reservoir. Pumps, motors and power units are available in four sizes: 15, 25, 40 and 60 g.p.m., cylinders in diameters of 4, 5 and 6 in., and valves in two sizes, for control of flows up to 50 and 70 g.p.m.

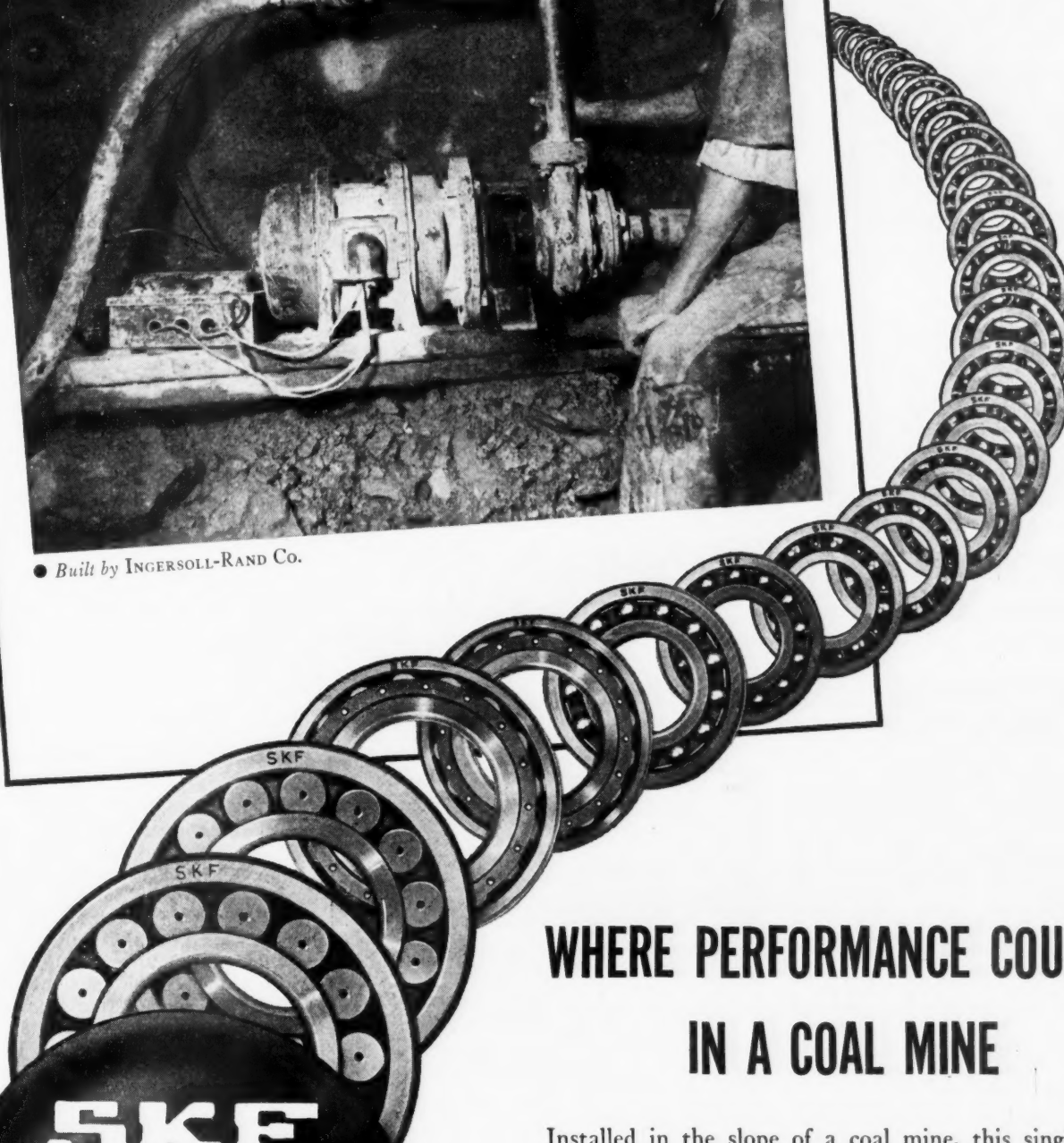
LaPlant-Choate pumps and motors are said to include such design features as interchangeable spur-type gears, needle roller bearings, positive lubrication and bronze reversible thrust plates. The pumps are designed for automotive, portable or stationary installations and may be electric-motor or engine driven. The power unit, according to the manufacturer, incorporates revolutionary principles such as surge control, a supercharged pump and small-capacity reservoir. Valves are spool-type offering three positions (float position optional) and self-centering, and may be had with or without automatic surge control. Cylinders are double-acting and can be mounted in any position. Pistons are ring-type for high-pressure sealing with piston rods chrome-plated.

Plastic-Lined Pipe

Amercoat Division, American Pipe & Construction Co., P. O. Box 3428, Terminal Annex, Los Angeles 54, Calif., has reported development of a plastic-lined steel pipe for handling of strong chemicals. The new pipe is said to combine the structural strength of steel with the chemical resistance of vinyl resins for use where pipe corrosion is a problem. The plastic tube placed inside steel pipe is bonded to it by a special process and is flared out over the flanges, providing a continuous chemical-resistant liner throughout the entire piping system, the company says.



● Built by INGERSOLL-RAND Co.



SKF
Puts the
RIGHT BEARING
in the
RIGHT PLACE

WHERE PERFORMANCE COUNTS IN A COAL MINE

Installed in the slope of a coal mine, this single-stage Motorpump works in series with an I-R steam pump half way up the slope. SKF Ball Bearings on its main shaft eliminate costly shutdowns . . . assure smooth, vibrationless performance . . . maintain shaft rigidity, and reduce stuffing box maintenance. In exchange for infrequent lubrication, they give a long, profitable, productive life. The trademark "SKF" on a bearing is *your* warranty of the right bearing in the right place.

6388

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

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*It's Engineered to Meet
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Sprague & Henwood Core Drilling Machines are modern in every respect . . . Can EASILY perform the work expected of them! That's because they are built to meet the demand of present day core drilling work! The machines are high speed, exceptionally sturdy, constructed to withstand rugged service. Available with two distinct types of feeds, "Screwfeed" and "Hydraulic," according to the type of swivel head selected. Have many exclusive features. Write today for full details.



Bore DIAMOND BITS are also manufactured by Sprague & Henwood. Full details sent upon request.

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Backed by 25 Years Experience with Storage Battery Locomotives

THE GREENSBURG "CRUISER"

*Operators say— "20%
MORE EFFICIENT
than average Storage
Battery Locomotives"*



**All Locomotives
CUSTOM-BUILT
to your requirements**

FEATURES

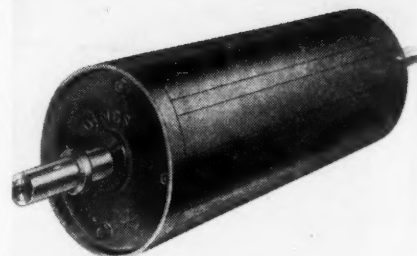
- 2-motor drive; total 24 h.p.
- Series parallel controller.
- Extra long journal springs for better trackability, roadability.
- Oil-tight, leakproof transmission. Use auto oil, renew once every 6 months.
- Adjustable Timken Roller Bearings throughout.
- Strong, Simple construction. Low maintenance cost.

**MORE
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STORAGE
BATTERY
CAPACITY**

THE GREENSBURG MACHINE CO.

Makers of Custom-Built Storage Battery Locomotives

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Magnetic Pulley

The Perma-Pulley, a new permanent magnetic pulley with Alnico poles, has been developed by the Dings Magnetic Separator Co., Milwaukee, Wis., and is available in 53 sizes ranging from 12 in. in diameter by 12 in. in width to 30x60 in. Designed for use as head pulleys in a belt-conveyor system or in a self-contained magnetic pulley-type separator unit, to remove magnetic substances automatically, the Perma-Pulley has a crown face to prevent belt weaving and to aid in even distribution of the burden across the belt as it passes over the pulley, according to the company. Shaft diameters are standard to permit replacement of non-magnetic head pulleys in existing installations without changing bearings or shaft mountings. Head plates of the pulley are non-magnetic to prevent collection of magnetic material on the outside edges, it is said. No electrical wiring is required.

Wood Preservative Paint

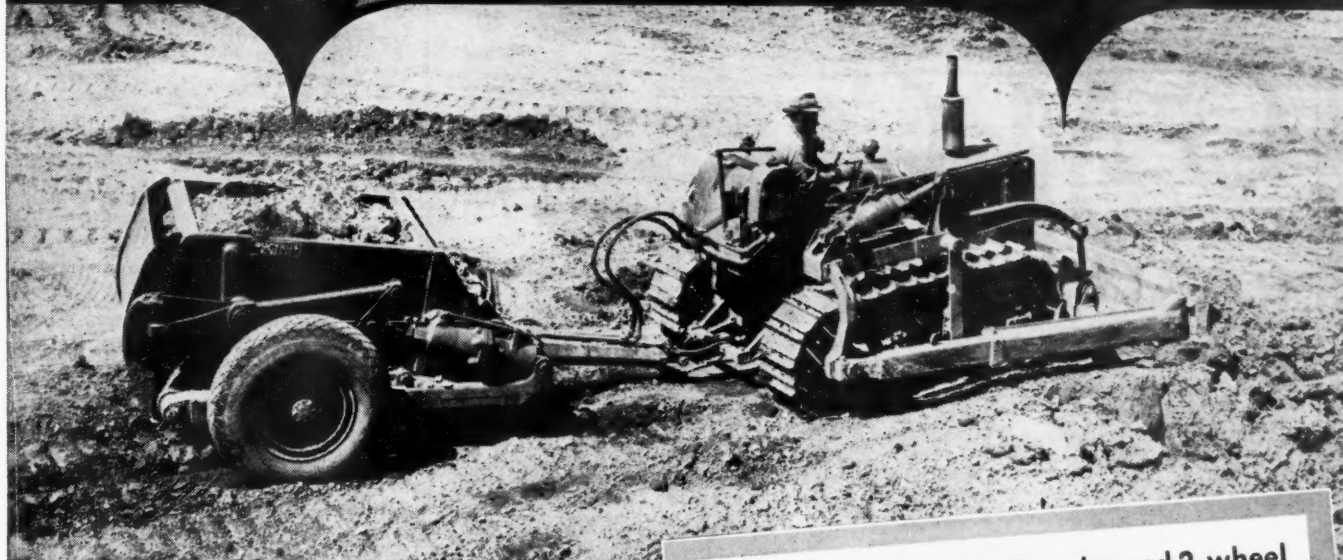
Speco, Inc., 3142 Superior Ave., Cleveland, Ohio, has announced a new wood-preservative paint, known as "Woodtrem," available in black and aluminum, said to prevent rot and decay. Woodtrem penetrates deeply into the pores of the wood and effectively seals out moisture, according to the manufacturer, and tests are said to indicate that surfaces coated with it will remain free from rot at least twice as long as wood surfaces coated with ordinary paint. Its creosote content is poisonous to bacteria and the paint also repels insects.

Trade Literature

**Available Without Charge on
Request to the Manufacturer**

Power Shovel—Lima Shovel & Crane Division, Lima-Hamilton Corp., Lima, Ohio. Bulletin No. 64-A contains a complete, detailed description of the Lima Type 604 shovel, crane and dragline and presents its construction and operating features, specifications, capacities, and working ranges.

Double Up on work capacity



With a Bucyrus-Erie Bullgrader and 2-wheel scraper combination you get both versatility and long-haul capacity — a complete dirt-moving unit operated by one man.

YOUR tractor is doubly equipped for maximum usefulness when you use the dual unit combination of a Bucyrus-Erie Bullgrader (or bulldozer) and a two-wheel scraper because you put both ends of the tractor to work. With the blade as front-end equipment, the scraper hitched to the drawbar, and both units hydraulically operated from the same pump, you have a one-man team that materially speeds up your dirt moving — loading and hauling the long-haul dirt with the scraper and moving the short-haul dirt with the Bullgrader.

By alternating the hydraulic control from one unit to the other the operator of the dual unit can: (1) dig dirt from a cut, (2) place dirt in a fill, (3) level the fill, (4) keep hauling roads in good shape, (5) back-

slope, (6) build shoulders, (7) cut ditches, and perform many other time-saving jobs. There's no delay, no time lost in switching from one kind of service to another. The operator simply changes his control from scraper to blade and back again, as the job requires.

This hook-up will give your tractor the extra work capacity that quickly cuts your dirt-moving costs. Find out about the complete line of Bucyrus-Erie tractor equipment from your International Industrial Tractor Distributor. Bucyrus-Erie Co., South Milwaukee, Wisconsin.

82T47

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INTERNATIONAL
Industrial
Tractor
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For **BUCYRUS ERIE** Balanced Tractor Equipment



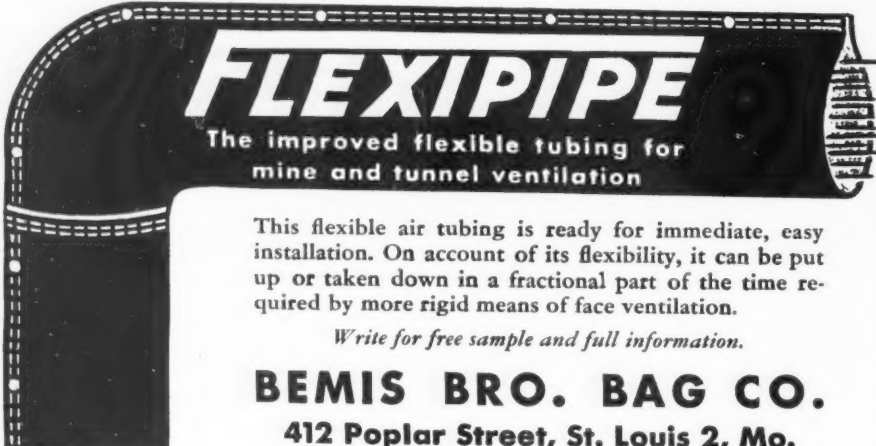
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STATIONARY MOTOR RESISTANCE

... built of helical coils of alloy resistance-wire, supported by an external frame for complete protection. Coils are alloy wire (contains no nickel) highly resistant to mine water or mill fumes. Vibration or sudden temperature changes will not affect coils. Units can be stacked and bolted together.

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The improved flexible tubing for
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This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by more rigid means of face ventilation.

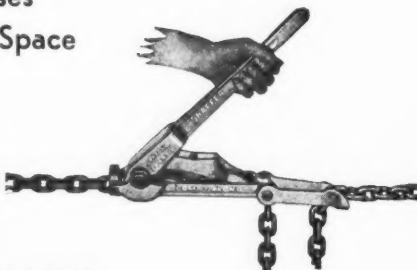
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SHAFFER "Come-Along"

- The Tool of a Hundred Uses
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- Extra Chain Available

MIDGET	STANDARD	HVY. DUTY
Equipped with 4 ft. $\frac{1}{4}$ " BBB chain	Equipped with 5 ft. $\frac{1}{2}$ " BBB chain	Equipped with 6 ft. $\frac{7}{16}$ " BBB chain
\$6.50	\$9.50	\$12.50



J. E. SHAFFER COMPANY
621 EAST CAMERON ST. TULSA, OKLAHOMA

Power Transmission—The Falk Corp., 3001 West Canal St., Milwaukee 8, Wis. Bulletin No. 10,000 offers descriptions and illustrations of all Falk products, such as gears, speed reducers, "Motoreducers," couplings, high-speed drives, backstops, marine drives, special gear drives and available services and facilities, including steel casting, machining weldments and engineering.

Resistors—Ward Leonard Electric Co., 31 South St., Mt. Vernon, N. Y. Bulletin No. 35 covers three forms of high-current resistors known as Edgeohm, Barohm and Loopohm, illustrating and describing the various types of ribbon resistors available for high-current applications. Data on resistance values, current-carrying capacities, dimensions, methods of mounting, etc., are included.

Pumps—Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Bulletin No. 08B6319B describes the A-C automatic, self-priming pump that is equipped with a new-type automatic spring valve which is said to give faster, smoother transition from priming or vacuum pumping to straight centrifugal action. Specifications, design, operating and installation features are presented.

Fire Hose—B. F. Goodrich Co., Akron, Ohio. Catalog section on its line of industrial fire hose describes the construction methods and materials used and offers approximate data on sizes, approximate weights per 50 ft. coupled and uncoupled, initial test pressures, and couplings.

Diesel Generating Sets—National Supply Co., Superior Engine Division, Springfield, Ohio. Bulletin No. 4709 illustrates and describes Superior diesel generator sets ranging in size from 175 to 1500 hp., and provides dimensions and specifications for the various models, including supercharged and non-supercharged 6- or 8-cylinder sets and rated at 120 to 1055 kw.

Nuts—Standard Pressed Steel Co., Jenkintown, Pa. Catalog No. 619 presents detailed data on the construction, features, sizes and specifications of the "Flexloc" self-locking nut.

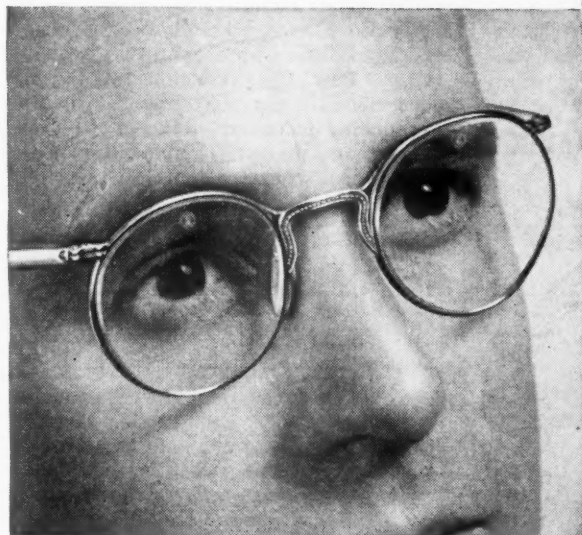
Tractor—Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wis. Bulletin No. MS-608 describes A-C's new HD-19 "Torque-Converter" tractor, called by the company the "World's Largest, Most Powerful Tractor." Construction and design specifications, operating features and capacities are accompanied by on-the-job illustrations.

Valves—Jenkins Bros., 80 White St., New York 13. Folder describes the new Fig. 270-U bronze gate valve with Monel seat rings, said to be especially suited for any 200-lb. service where conditions are unusually

the slightest eye-injury COSTS MORE



than the
goggles that
can prevent it



*A-O Safety Goggles
Safeguard the Eyes
of Industry*

Typical records indicate that even the slightest of eye-injuries costs (in lost time, idle machine time and medical attention) approximately \$15.00. The Society for the Prevention of Blindness estimates that *ninety-eight per cent* of these injuries can be prevented by the use of safety goggles (averaging in cost \$1.50 a pair). What piece of mine equipment costs so little and returns its cost so many times?

Let your nearest MSA Representative show you the complete story.

American Optical



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SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL INDUSTRIAL CITIES

I'M YOUR MAN

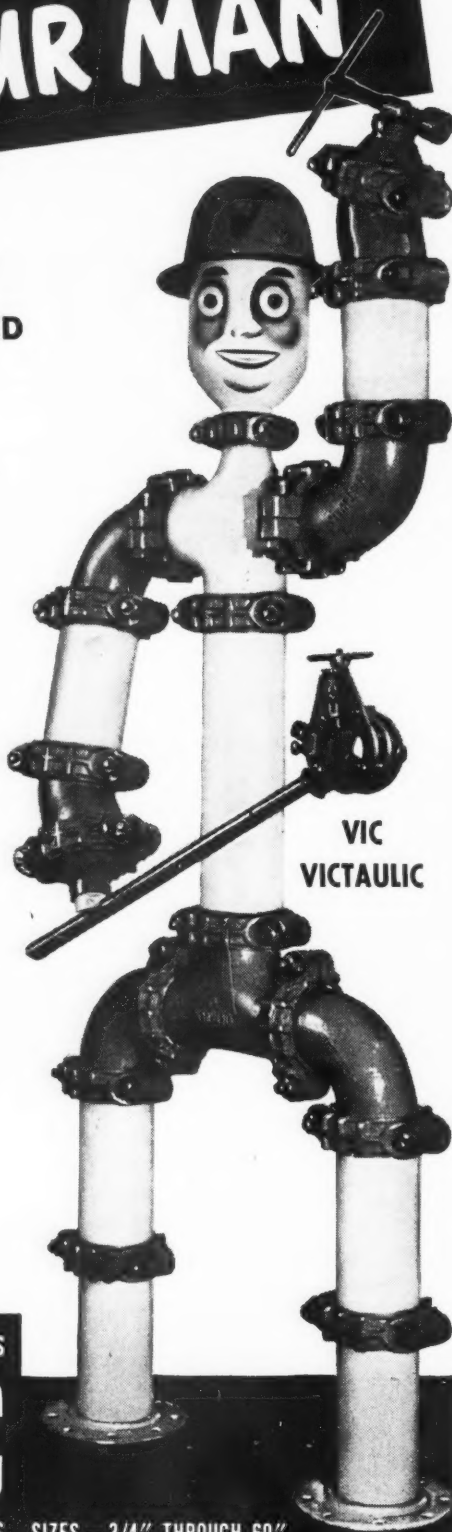
WITH AN AMAZING NEW RATCHET-OPERATED "VIC-GROOVER"!

VIC-GROOVER is a newly developed tool for grooving the ends of pipe to take Victaulic Couplings... and you can get it today!

The handy, ratchet-operated VIC-GROOVER is light-weight for ease of carrying...and it makes its groove at exactly the right spot, to exactly the right depth, *automatically!* COMPARE VIC-GROOVER with any regular pipe threader and you'll find it takes only half the effort to operate—and half the time!

Now it is easier than ever to make your piping system all-Victaulic easily, quickly, cheaply with VIC-GROOVER and Victaulic Couplings and Victaulic Full-Flow Elbows, Tees and other Fittings.

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EFFICIENT FULL FLOW FITTINGS SIZES—3/4" THROUGH 60"

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severe. The complete Jenkins line of 34 other bronze gate valves, with pressure ratings and size ranges, is covered.

Lubrication—The Texas Co., 135 East 42nd St., New York 17. January issue of the company's publication, "Lubrication," contains an article entitled "Lubrication of Underground Mining Machinery." Factors and methods involved in the lubrication of many different units are discussed.

Fuses—Pierce Renewable Fuses, Inc., 211-219 Hertle Ave., Buffalo, N. Y. Bulletin discusses the construction and features of the Pierce "Balanced-Lag" renewable fuses, said to be designed so that unnecessary blowing under sustained but safe overloads is reduced.

Earthmover—Wooldridge Mfg. Co., Sunnyvale, Calif. Bulletin No. TA-750 outlines the improved operation and construction features of the company's "Terra-Cobra" high-speed tractor-scraper earthmover combinations. On-the-job photographs, capacities and operating details are included.

Materials-Handling Equipment, Construction and Maintenance Tools—Syntron Co., 975 Lexington, Homer City, Pa. Catalog illustrates and describes the complete line of Syntron products, including its full line of vibratory materials-handling equipment and construction and maintenance tools.

Resistors—The Electric Controller & Mfg. Co., 2700 East 79th St., Cleveland 4, Ohio. Bulletin No. 942 describes in detail the construction and features of "TAB-WELD" plate resistors for controller and starter duty.


Shaft Rollers and Idle Sheaves—Goodyear Tire & Rubber Co., Molded Goods Division, St. Mary's, Ohio. Booklet discusses the features and new developments in the use of rubber with shaft rollers and idler sheave fillers and includes installation photographs, engineering tables and formulas, etc.

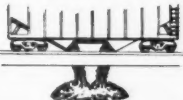
Visual Records—Remington Rand Inc., 315 Fourth Ave., New York 10. Bulletin No. KD-361 outlines the features of Kardex signal control as a tool of management for graphic presentation of facts in control of sales, stocks, personnel, and collections, with resulting work simplification and record-cost reduction.

Power Cranes & Shovels—Power Crane & Shovel Association, 74 Trinity Place, New York 6. A strip slide film in color entitled, "The Changing World," which portrays the functional design of power cranes and shovels, their application to construction jobs and job analysis, has been prepared by the Association and may be borrowed without charge by school and college groups, engineering societies,




Speed winter turnaround of cars with coal's best anti-freeze!

"PASS the SALT"

Each winter more and more coal mine operators treat coal with **STERLING** Rock Salt to prevent freezing in transit. 

For coal delivered frozen at customers' yards must be unfrozen for unloading. 

Return of cars to mines is severely delayed and -with the national car shortage-everyone suffers, from consumer to miner! **STERLING**

Rock Salt  serves at the mines, too,  by removing snow and ice from roads, scales, tracks, platforms -helping prevent accidents,  delays.

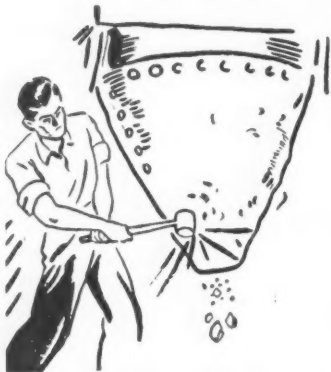
Write *today* for folder  telling when and how to use **STERLING** Rock Salt!

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"tattle-tale"

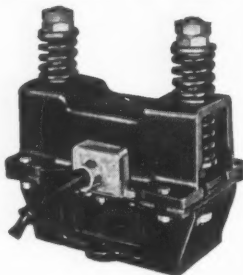
Hammer Marks on Your Bins and Hoppers



That tell of lost man-hours
and slowed-up production?

SYNTRON
"Pulsating Magnet"

ELECTRIC VIBRATORS



**Keep Bins, Hoppers
and Chutes
Open and Free-Flowing**

—by controlled, pulsating vibrations that penetrate the mass—activate each particle and break down arching and plugging.

Eliminate hammering and pounding.

Write for illustrated folder.

SYNTRON CO.

975 Lexington Homer City, Pa.

industrial organizations, etc. The film, which has been more than a year in the making, is offered in response to requests for education information on power-shovel and crane functions and design.

Industrial Notes

Allis-Chalmers Mfg. Co., Milwaukee, is celebrating in 1947 its 100-year anniversary of industrial engineering and manufacturing. Establishment of the company, which is said to have the world's largest line of major industrial products, was conceived by Edward P. Allis, a native of Cazenovia, N. Y. who in 1861 acquired the 14-year-old French burr mill stone firm of Decker & Seville in Milwaukee. Allis-Chalmers reports that today, in a new atomic age, it devotes a great share of its substantial industrial production to power-generation, power-distribution and power-utilization equipment for the crushing, cement and mining industries and numbers many of these products among the more than 1,600 being turned out for industry the world over.

The early Allis organization gained ready-made world fame in the mining industry in 1901 when the Edward P. Allis Co. was joined by the Fraser & Chalmers Co., the Gates Iron Works, both of Chicago, and the Dickson Mfg. Co., Scranton, Pa. Fraser & Chalmers dated back to 1849, Gates to 1842 and Dickson to 1856. Today, the company has more than 28,000 employees and operates nine plants.

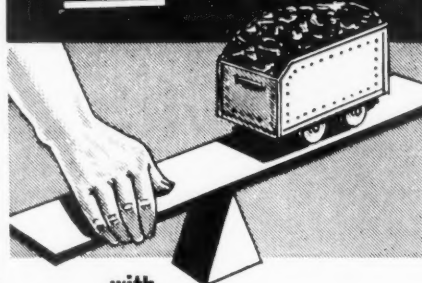
Joy Mfg. Co., Pittsburgh, Pa., has appointed W. L. Wearly vice president in charge of coal-mining sales. Mr. Wearly joined Joy's engineering staff in 1937 upon graduation from Purdue University and in 1939 was appointed service manager of the company. In 1946, when Joy bought the La-Del Conveyor & Mfg. Co., and merged with the Sullivan Machinery Co., Mr. Wearly was appointed service manager for the combined companies.

I-T-E Circuit Breaker Co., Philadelphia, has elected Roy E. Murphy vice president in charge of sales, to coordinate the combined selling of I-T-E and its subsidiary, the Railway & Industrial Engineering Co., Greensburg, Pa. Mr. Murphy has been associated with I-T-E since 1934, as sales manager and member of the board of directors.

Atlas Powder Co., Wilmington, Del., has elected as a vice president Weston G. Frome, general manager of the explosive department and a member of the board of directors. He will continue as head of the explosives department.

Swan-Finch Oil Corp., New York,

**UP with Production ...
DOWN with Power Costs**



with
MESCOWELD RAIL BONDS

Guaranteed to do a perfect bonding job for you, MESCO bonds reduce power losses due to faulty bonding and assure maximum conductivity at all times.

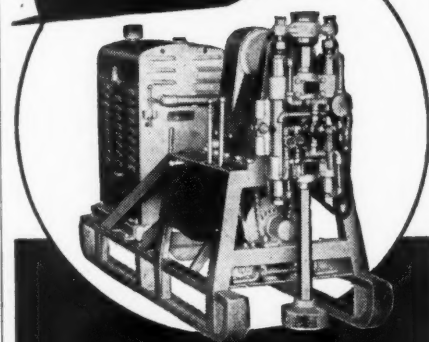
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HEmlock 8332

**Diamond
Core
Drilling**
CONTRACTORS



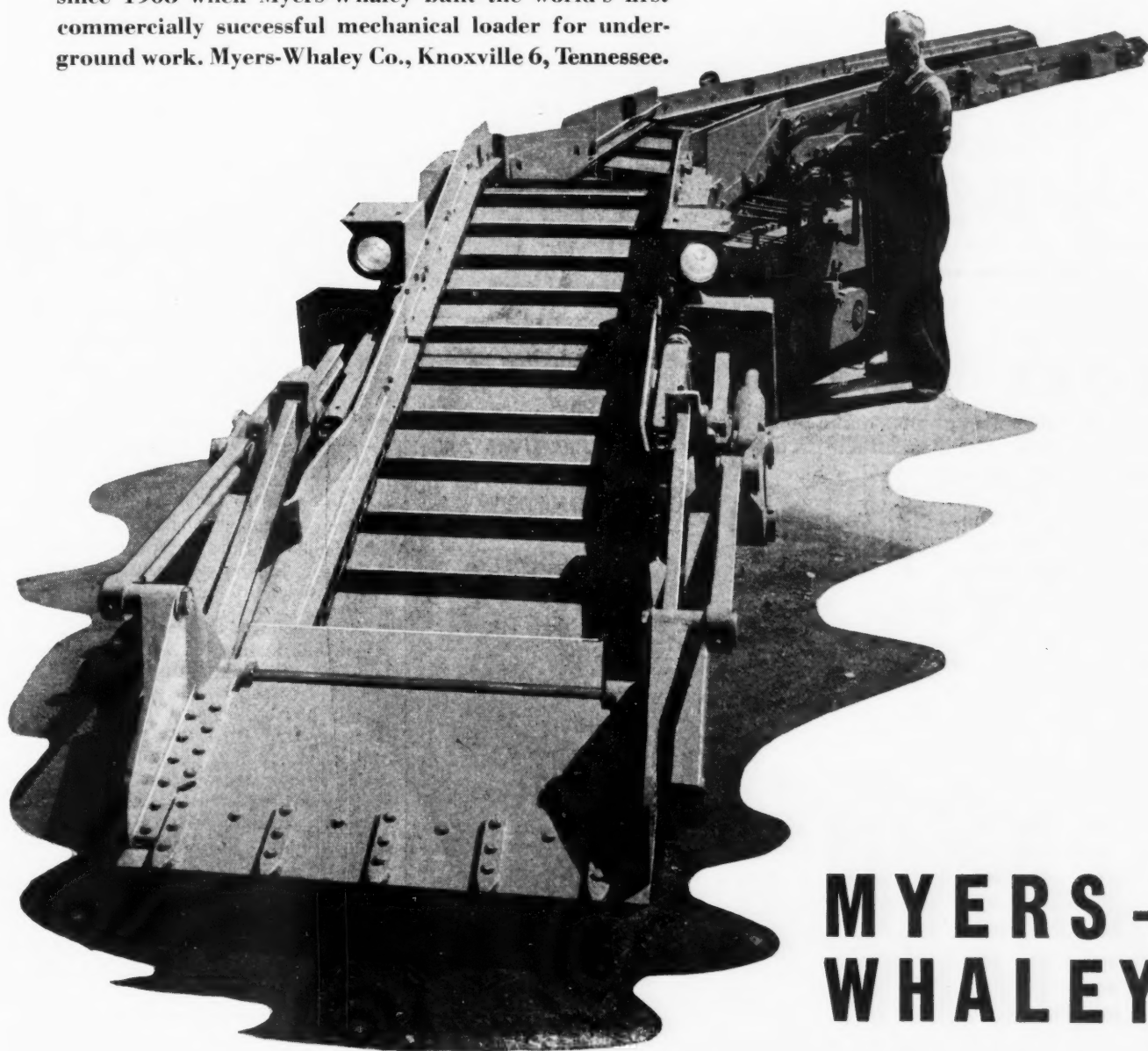
Testing mineral properties with our light gasoline drills. **SATISFACTORY COAL CORES GUARANTEED.** Ground solidification by our pre-pressure grouting method for shafts. Wetmine areas, horizontal holes for drainage. Electric drills for inside mine drilling.

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HUNTINGTON • WEST VIRGINIA

WHERE THE LOADING IS TOUGHEST... YOU'LL FIND THE WHALEY "AUTOMAT"

Where the loading is toughest... where dependability and efficiency are equally essential for coal or rock work, experienced mine operators know they can turn to the Whaley "Automat" with complete confidence. Back of this confidence are over 40 years of experience and know-how in building loading machines exclusively for the mining industry. Back of this confidence are engineers and designers who know, first hand, the problems of mining... craftsmen who take a deep pride in the perfection and balance of every part that goes into the Whaley "Automat." Yes, high standards of engineering and workmanship have been responsible for the "Automat's" reputation for dependability and efficiency since 1908 when Myers-Whaley built the world's first commercially successful mechanical loader for underground work. Myers-Whaley Co., Knoxville 6, Tennessee.

Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tippie or any lump of rock your cars, aerial tram or larries can take.



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Mechanical Loaders Exclusively for Over 40 Years

ONLY
RUBEROID
Insulating Tape
has all these 7 Features



- 1 Double grip . . . both sides adhesive.
- 2 Great tensile strength . . . tough.
- 3 Won't tear, ravel or pucker.
- 4 Resists abrasion.
- 5 Acid- and alkali-proof.
- 6 Extra thick . . . one layer insulates.
- 7 Exceeds A.S.T.M. specifications by 300% in adhesive-ness, 26% in tensile strength, 290% in dielectric strength.

RUBEROID
INSULATING TAPE

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COAL COMES OUT FASTER

"FEMCO" trolleyphones make possible instant voice contact with haulage or gathering locomotives anywhere in the mine . . . eliminates delay, helps move coal faster and permits efficient distribution of empty cars. One operator reported savings of \$40 to \$50 a day with this system! Write for complete information today!

**WHEN CARS AND
 LOCOMOTIVES ARE
 DISPATCHED WITH**

FEMCO
TROLLEYPHONE



FARMERS ENGINEERING & MFG. CO.
 549 BRUSHTON AVE. PITTSBURGH 21, PA.

has appointed Anthony J. Zino Jr. assistant sales manager of the industrial sales division. Mr. Zino, for the last five years, has been eastern manager of the lubrication department of E. F. Houghton & Co.

Commercial Testing & Engineering Co. have acquired Coal Laboratories, Inc., Terre Haute, Ind., formerly operated under the supervision of the Indiana Coal Operators Association. Coal Laboratories, Inc., will be operated as one of the branches of the Commercial Testing & Engineering Co., serving coal operators in Indiana and the surrounding territory.

Mack Trucks, Inc., New York, has named W. E. Day, formerly chief metallurgist and general foundry superintendent, director of research.

Link-Belt Co., Chicago, has appointed Columbus Basile, who originally joined the company in 1928, superintendent of its Caldwell plant in Chicago. Leonard C. Heinlein, who first joined the plant in 1926, has been appointed to the newly created position of assistant superintendent at Link Belt's ball & roller-bearing division plant in Indianapolis.

Sterling Electric Motors, Los Angeles, has recently opened an office at 1836 Euclid Ave., Cleveland, Ohio, with J. W. Rickett in charge.

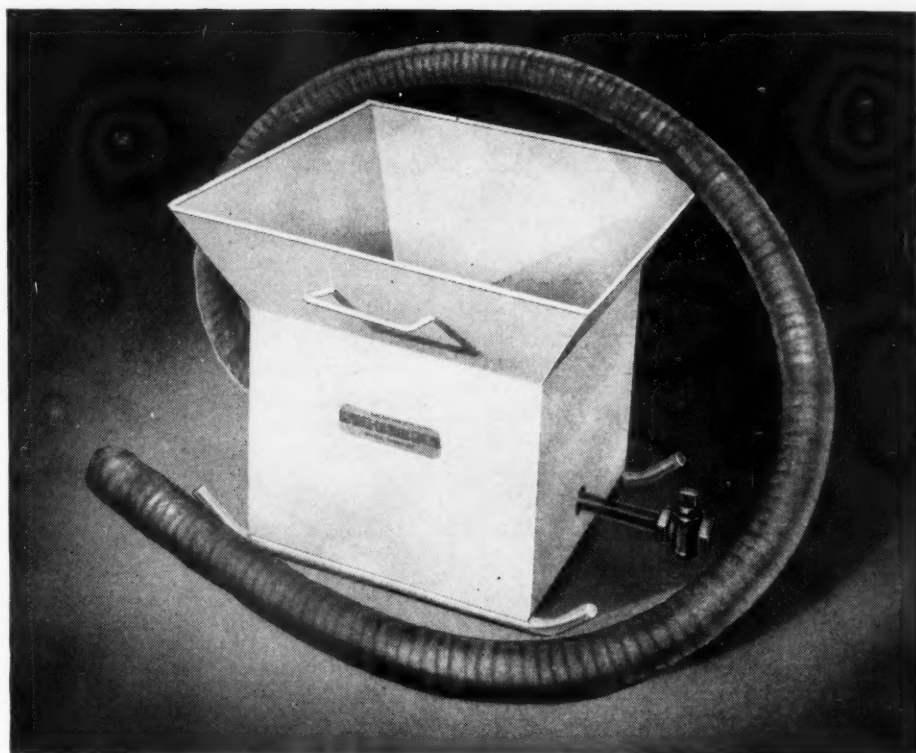
Hercules Steel Products Corp., Galion, Ohio, has appointed R. J. (Ray) Nymberg general sales manager. Mr. Nymberg was formerly sales manager, truck-equipment division, Gar Wood Industries, Inc.

Economy Pumps, Inc., Hamilton, Ohio, has acquired from the War Assets Corporation the war-time addition to its plant, built by the Defense Plant Corp. in 1942 at a cost of \$705,000 to house an Economy subsidiary, Liberty Planers, Inc. The building contains 100,000 sq. ft. and will house both of Economy's subsidiaries, Liberty Planers and the Klipfel Mfg. Co.

Gar Wood Industries, Inc., Wayne, Mich., has announced a revised sales and manufacturing organization to offer better service to customers. E. B. Hill has been named general sales manager and R. F. Whitworth, general service manager, and four domestic regional sales offices under Mr. Hill have been created. Promoted to regional managers were Ross Miller, San Francisco, A. C. Berg, Wayne, Mich., W. G. Barrett, Boston, and H. C. Hatch, Washington, D. C. At the same time, operations of the company have been consolidated into three basic divisions. The Findlay Division, Findlay, Ohio, assumes the manufacture and distribution of Gar Wood tractor equipment and Buckeye construction machinery. The Wayne Division, Wayne, Mich., continues to manufacture and distribute Gar Wood truck equipment and the St. Paul Division, Minneapolis, Minn., will

NOW YOU CAN HAVE...

HIGH ROCK DUSTER EFFICIENCY AT AN AMAZINGLY LOW COST!



WITH THE



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Because of a revolutionary departure from conventional rock duster design, we have produced a medium pressure duster that is setting new standards of performance and efficiency in coal mines. Based on the principle of jet propulsion, the Cantrell Jet Duster completely atomizes the dust before it is introduced into the hose. This means that it will project rock dust at a capacity of 50 to 100 pounds per minute through as much as a fifty foot hose. With our standard 10 foot hose, the "Jet Duster" will plaster all cracks and corners of roof and rib in entries up to 20 feet wide.

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With the new Cantrell Jet Duster, coal mine dusting becomes a more inexpensive and simpler problem in your mine. Write today for Bulletin No. 7129, which gives you all details on this remarkable piece of equipment.

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Jeffrey Completes New Research Center

THIS MODERN RESEARCH CENTER recently completed by the Jeffrey Mfg. Co., Columbus, Ohio, is fully equipped to perform tests of sufficient scope to insure accurate predetermination of field results and also for the construction of experimental and pilot-plant equipment, according to the company. The unit is staffed with experienced testing and development technicians and engineers and is equipped with complete facilities for the continuation of the Jeffrey research development program.

manufacture and distribute St. Paul hoists, bodies and truck patrols. J. D. Towne has been appointed division manager and W. S. Blakeslee has been promoted to sales manager of the Wayne Division.

Hewitt Rubber Division, Hewitt-

Robbins, Inc., Buffalo, N. Y., has appointed Industrial Equipment Co., Louisville, Ky., as a distributor of its entire line of industrial hose, belting and packing in the area within a 45-mile radius of Louisville. William A. Mivelaz is owner of the Industrial Equipment Co.

Allis-Chalmers Mfg. Co., Milwaukee, has named A. J. Jorgensen chief mechanical engineer, and F. R. Gruner mechanical research and development engineer, of the company's basic industries department, and B. H. Puerner, manager of the department's crushing, cement and mining-machinery section. The transfer of C. E. Lacy, sales representative, from the company's Atlanta office to its Birmingham office also has been announced.

Reliance Electric & Engineering Co., Ashtabula, Ohio, on Nov. 15, received nearly 5,000 people from Ashtabula and neighboring communities at an "Open House" marking the swing into virtually full production of its new plant in that community. In addition to enjoying the entertainment, the visitors saw the plant in full operation.

Johns-Manville Corp., New York, has acquired Van Cleef Bros., Inc., Chicago, manufacturers of "Dutch Brand" industrial and automotive products. The firm will be operated as a wholly owned subsidiary and no change is being made in the personnel, manufacturing, merchandising or distribution system. Van Cleef Bros., Inc., was established in 1909.

Davey Compressor Co., Kent, Ohio, has appointed H. A. Pratt, formerly superintendent of its Kent plant, parts and service manager.

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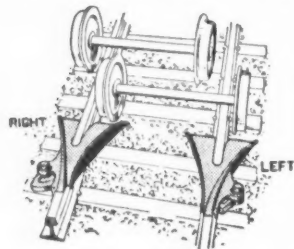
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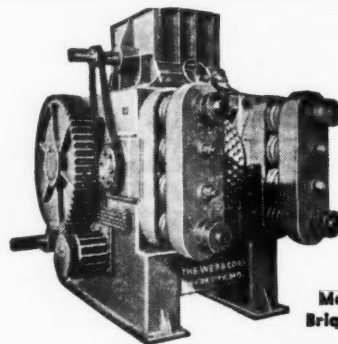
How Anchor Rerailers Work. "Anchor" rerailers are used in pairs, and will retract wheels from either or both sides of rail at same time. Each Rerailer straddles the rail, and the narrow end on top of the rail. The derailed wheel comes up the gradual slope, and is forced back on to the rail by the guiding grooves and ridges. Can be used anywhere on the track. The "Anchor" Rerailer is the only one that has a self-contained lock.

Size of Rerailer	For Use on Rails as Follows:	Locomotive or Car Capacity	Price Per Pair
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No. 5	70 lbs. to 100 lbs.	100 tons	80.00
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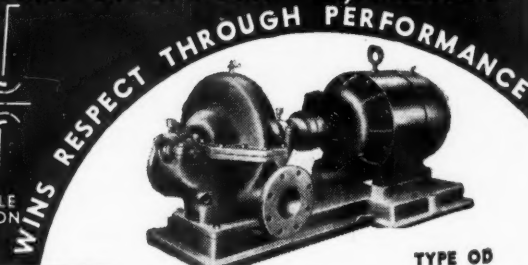
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Complete Briquetting Plants Designed and Constructed.

Another Great PUMP "by Aurora"



DOUBLE SUCTION



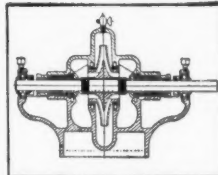
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HORIZONTAL SPLIT CASE DOUBLE SUCTION SINGLE & Two Stage SIDE SUCTION VERTICAL NON CLOG SUMP MIXED FLOW SPECIAL DESIGN

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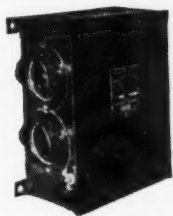
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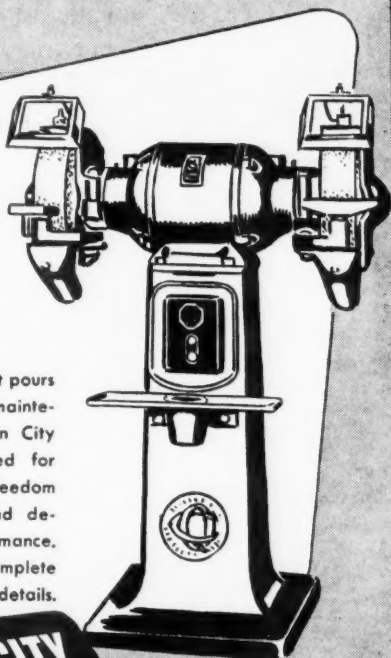
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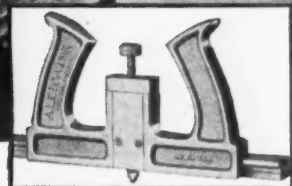
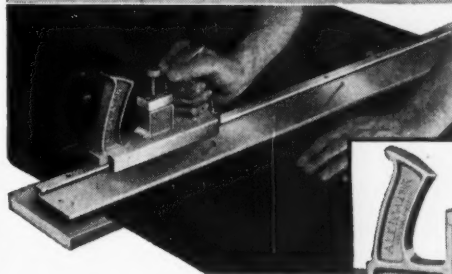


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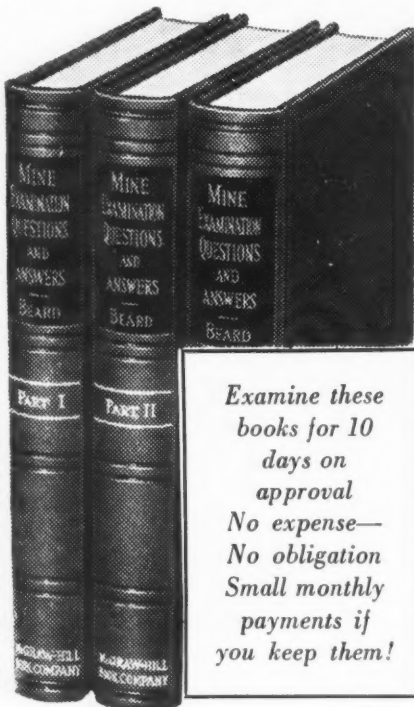
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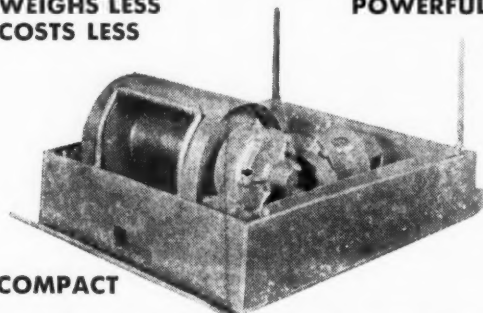
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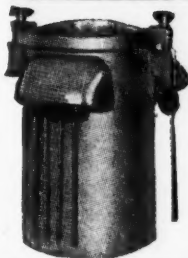
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- 1—124 E. J. Goodman Slabbing, 250 V, D.C.
- 1—36 B Jeffrey, 250 V, D.C.
- 1—12 G3, Goodman Shortwall, A.C.

LOCOMOTIVES

- 1—4 ton Jeffrey with MH96 Motors & Reel.
- 1—5½ ton Goodman with 2 type 4L, 250 V. motors.
- 1—5½ ton Ironton Storage Battery Locomotive.
- 1—6 ton GE Gathering Locomotive.
- 1—6 ton Jeffrey Gathering Locomotive.

M. G. SETS

- 1—60 KW, 250 V, D.C. with 100 HP, Synchronous motor.
- 1—75 KW, 250 V, D.C. with 112 HP, Synchronous motor.
- 1—150 KW, Ridgway, 275 V, D.C., 3/60/2200/1200.
- 1—200 KW, Westinghouse, 600 V, 3/60/2200.

ELECTRIC MOTORS

- 1—500 HP, GE Slipring 3/60/2200/600 RPM.
- 1—400 HP, Allis-Chalmers, SC 3/600/2200/1150.
- 1—250 HP, GE, type I, Form M.
- 1—185 HP, Burke SC, 3/60/2200/1150.
- 1—150 HP, GE, Squirrel Cage, 3/60/900.
- 1—125 HP, GE, Squirrel Cage, 3/60/900.
- 1—100 HP, Synchronous Motor, 3/60/440/1200 RPM.
- 1—100 HP, GE, Squirrel Cage, 3/60/900 RPM.
- 1—40 HP, GE, 1200 RPM, 3/60/220-440 V.
- 4—25 HP, GE, Squirrel Cage, 3/60/865 RPM.
- 2—15 HP, Westinghouse, Squirrel Cage, 3/60/900.
- 2—10 HP, Westinghouse, CS, 3/60/440 V.
- 1—7½ HP, Squirrel Cage, 3/60/1800.
- 1—5 HP, Westinghouse, Squirrel Cage, 3/60/1800.

TRANSFORMERS

- 1—25 KVA, GE 1/60/2200/220/110 V.
- 2—75 KVA, Westinghouse, 1/60/6600/2200.
- 3—125 KVA, Westinghouse, 1/60/2200/440/220.

COAL CRUSHERS

- 1—36"x36" Jeffrey S.R. Coal Crusher Gear Drive.
- 1—18"x18" Jeffrey S.R.

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STRIPPING & MINING EQUIPMENT

Coal Crushers
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Electric Generator Sets
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- 1—4½ Ton Goodman equipped with Cable and Power Reel, 36" Gauge.
- 2—7½ Ton Goodmans, 36" Gauge.

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- 1—24"x10' American Quick Change Lathe.
- 1—20"x8' Monarch Quick Change Lathe—Motorized.
- 2—Drill Presses 16" to 26".
- 1—200 Amp. Smith Welder—on wheels.
- 1—18" Gould & Eberhardt Shaper.
- 1—Cleveland Combination Punch & Shear, 26" Throat.
- 1—Power Hack Saw, B.D.
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- 2—Rheolaveur Launderers, 60—80 Ton Capacity, complete with Header, Feed Pipes, Supporting Frame, Dividing Head, Sampler and 10'x12' Steel Bin.

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- 1—36" St. Louis Ring Type.
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- 1—7-BU Joy Loader, Cat Mounted, Low Pedestal, 250 Volts DC, Overhauled and Guaranteed.

PUMPS

- 1—2" Marsh, V-Belted to 15 H.P. Motor 150 GPM, 160' Head.
- 2—Ingersoll-Rand Motor Mounted, 150 GPM, 400' Head.
- 2—10x10 Allis-Chalmers Centrifugal, 1500 GPM, 56' Head, direct connected to a 100 H.P., 2300 Volt Center Drive Motor.
- 5—5x5 Deming Oil-Rite Piston Pumps—Motorized.

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- 3—100 Ton Fairbanks, Steel I Beam Stringers, Inspected by W. W. & I. B. in April, 1947.

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- 2—Coke Extractors, 250 Volts DC, trolley operated, Std. R. R. Gauge.

LARRY CARS

- 4—Connellsville Larry Cars, Trolley Operated, 6 Ton Capacity.

CONVEYORS

- 3—24" Belt Conveyors, 15' to 85' Centers, 2 equipped with Ding's Pulleys.
- 1—30" Belt Conveyor, 370' Centers.
- 1—30" Belt Conveyor, 70' Centers.
- 1—36" Belt Conveyor, 50' Centers.
- 1—28" Apron Conveyor, 21' centers. Flight Conveyors from 12" to 30" up to 170' centers.

RAILS

- 15 Tons—30# Relayers. 75 Tons—65# Relayers.
- 10 Tons—40# Relayers.

MINE FANS

- 1—8-H60 Aerodyne Exhausting Fan, with Air Locks, Hood, etc. with 75 H.P. Motor—Purchased new in 1942.

HOISTS

- 1—No. 22 Vulcan, with 40 H.P. Motor, Controller and Grids.
- 1—No. 22 Vulcan, with Man Cage, 30' Steel Head-frame and 40 H.P. Single Speed Elevator Type Motor, equipped with Solenoid Brake (Both Hoists purchased new in 1942 and 1944).
- 1—Single Drum Gasoline Hoist, direct connected to 2½x4¼ Wisc. Gas. Engine.

PIT CARS

- 160—Card Iron Works R. B. Pit Cars, 36" Ga.
- 1—Card Iron Works Rock Car, 90 Cu. Ft. Cap.

MINE LAMPS

- 188—Edison Model P Mine Lamps, with Charger and Racks.
- 5—Wolfe Safety Lamps.

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- AC & DC Motors, new & used, from 2 H.P. to 75 H.P.
- R.C. Stranded Copper Wire, 2/0—4/0 & 350,000 CMS.
- Trolley Wire 2/0 & 4/0 Rd. & Fig. 8.
- Trolley Hangers and Supplies, New and Used.
- Wall Telephones, Jacks, \$20,000.00 worth of New Supplies.
- New CE-7 Sullivan Coal Cutter Parts.
- New and Used Wire Rope, ¾" to 1¼".
- 750 New 3-Cond. No. 6 All Rubber Power Cable.
- 1—3,000' Tramway, complete with buckets, etc.
- 1—750' Jig-back Tram, complete with motor.
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SQUIRREL CAGE MOTORS					
3 PHASE 60 CYCLE					
QU.	H.P.	MAKE	TYPE	VOLTS	R.P.M.
7	10	Whse.	C.S.	440	575
1	10	G.E.	KT-753	440	850
1	10	G.E.	K-324	208	1750
1	20	Al. Ch.	X	220	1750
1	20	G.E.	I.K.	220	565
1	20	Whse.	C.S.	550	1750
1	25	G.E.	F.T.R.	220	575
2	25	G.E.	K.T.	220	900
1	25	Whse.	C.S.	220	1160
1	30	Whse.	C.S.	550	900
1	35	G.E.	I.K.	2200	1200
1	40	F.M.	H	220	860
1	40	Al. Ch.	A.R.	440	860
2	40	F.M.	B	220	1150
1	40	G.E.	K.T.	220	1800
1	40	Whse.	CS-650	2200	1760
1	50	G.E.	I.K.	440	695
1	50	Whse.	C.S.	220	870
1	50	G.E.	K.T.	440	1160
1	50	Ideal	A.T.	440	1750
3	75	Al. Ch.	A.R.	220	1750
2	100	G.E.	I.K.	2300	695
5	100	F.M.	HS201C	440	900
4	125	Al. Ch.	A.R.	440	435
1	125	Whse.	CS-761	440	1750
3	125	Al. Ch.	A.R.	2200	1750
1	135	G.E.	KP542	440	1200
1	200	G.E.	I.K.	2300	490
1	200	Al. Ch.	A.R.	2200	3550
1	250	Whse.	C.S.	2200	1160

"WE CAN SUPPLY WITH ANY OF THE ABOVE THE NECESSARY CONTROL EQUIPMENT ENGINEERED TO YOUR SPECIFICATIONS."

SYNCHRONOUS MOTORS

3-PHASE 60-CYCLE					
QU.	H.P.	MAKE	P.F.	VOLTS	R.P.M.
1	30	Whse.	.8	220	1800
2	50	G.E.	.8	2200	600
1	60	G.E.	.8	440	1200
1	100	G.E.	.8	440	900
1	100	Whse.	1.0	2200	1200
1	150	G.E.	.8	440	900

1	150	G.E.	1.0	2200	900
1	150	G.E.	.8	2200	1200
1	500	G.E.	.8	2200	720
1	885	G.E.	.8	6600	514

CAN FURNISH ABOVE WITH EXCITERS, REDUCED VOLTAGE MAGNETIC OR SEMI-MAGNETIC OR FULL VOLTAGE MAGNETIC CONTROLLERS.

SLIP RING MOTORS

CONSTANT DUTY 3-PHASE 60-CYCLE					
QU.	H.P.	MAKE	TYPE	VOLTS	R.P.M.
2	5	Al. Ch.	ARY	440	720
3	10	G.E.	I-M	220	1120
2	15	G.E.	I-M	220	1200
1	20	G.E.	MT-326	220	900
2	25	G.E.	MT-326	2200	850
4	25	G.E.	MT-326	440	900
2	25	Whse.	CW-481	440	1750
1	30	Al. Ch.	ARY	440	900
1	30	Whse.	CW	440	1160
1	40	Al. Ch.	ANY	2200	435
3	40	G.E.	MT-346	550	560
1	40	Whse.	CW-644	220	870
3*	40	G.E.	I-M	600	1170
1	50	Al. Ch.	ARY	2200	490
2	50	G.E.	MT-536	2200	1200
1	75	G.E.	MT-548	440	1200
1	75	Al. Ch.	ARY	440	1750
1	100	G.E.	MT-556	440	900
2	125	G.E.	MT-558	2200	900
1	150	Whse.	CW	2200	1200
1	200	C.W.	127AQ	440	590
1	200	G.E.	I-M	2200	580
1	250	Whse.	CW	2200	580
1	300	G.E.	MT-412	2200	360
1	300	G.E.	MT-412	2200	1200
1	300	Al. Ch.	ARY	2200	514
1	300	G.E.	IM	440	580
1	350	Al. Ch.	ARY	2200	514
1	400	Whse.	CW-1108	2200	500
1	400	Al. Ch.	ARY	2200	514
1**	1150	Whse.	ARY	2200	600
1**	1200	Whse.	CW	2200	590

*—40-cycle. **—Heavy duty mill type.

CAN SUPPLY THE ABOVE WITH PRIMARY CONTROL (OCB OR MAGNETIC) SECONDARY CONTROL (NON-REV. DRUM CONTROLLER OR FULL MAGNETIC) WITH STARTING DUTY OR VARIABLE SPEED REGISTERS.

TRANSFORMERS OIL-COOLED

QU.	K.V.A.	Make	Voltage	Ph. Cy.
3	25	G.E.	1100/2200/608	1 40
3*	37½	Whse.	460/230/230/115	1 60
3	50	Whse.	2300/440/220	1 60
2	50	Wag.	132000/11880/575/287	1 60
3	130	G.E.	19000/9500/550/2200	1 60
6	165/247	G.E.	88100/22000/11000/430/215	1 60
1	200	Whse.	3810/2300/440	3 60
3	200	G.E.	2400/4500-Y138/230/460	1 60

MOTOR GENERATOR SETS

1—9 KW. G.E. CD. 250-VDC., dir. cen. 15-HP. G.E. Sq. Cg. Motor, 220/440-V., 3-Ph., 60-Cy., 1800-RPM.

4—25 KW. Whse. SK, 3-wire, 120/240-VDC., 1200-RPM., dir. cen. 40-HP. Sq Cg Motor, 220/440-V., 3-Ph., 60-Cy.

2—3-Unit Sets. (2) 25 KW. Whse. SK, 3-wire gen. 120/240-VDC., 1200-RPM., dir. cen. 75 or 100-HP. Sq. Cg. or Syn. Motor, 220/440 and 2200-V., 3-Ph., 60-Cy.

1—50 KW. Louis-Allis, 124/240-VDC., dir. cen. 75-HP. Sq. Cg. Motor, 220/440-V., 3-Ph., 60-Cy., 1200-RPM.

2—(NEW) G.E. 94 KW, 62½-VDC., Type CD generator, dir. cen. 135-HP. Sq. Cg. Motor, 220/440 V., 3-Ph., 60-Cy., 1200-RPM., generator and motor B.B., splash-proof.

1—100 KW. Al. Chal., 125-VDC. generator, dir. cen. 150-HP. syn. motor, 2300-V. 3-Ph., 60-Cy., 900-RPM.

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AIR COMPRESSORS:

12—Belted 360, 676, 870, 1000, 1300 ft.
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1000', 60", 600' 30", 300', 20", 1000', 42", 900', 48", 1450', 36", 1200', 24", 900', 18", 800', 16", 350', 14".

ELECTRIC LOCOMOTIVES:

15—3, 5, 8 ton Battery & Trolley.

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12—100, 150, 180 & 480 K.W.

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17—GD9, Elmc 21, Conway 20, 50, 60 & 75 and Sullivan HL3.

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16 yd. Elec. 180 ft. Boom Dragline.

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3/60/2200 Volts

3/60/440 Volts

2— 50 HP. G.E., Type TS, .8PF, 600 RPM
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1—150 HP. G.E., Type ATL, 1.PF, 900 RPM
—500 HP. G.E., Type TS, .8UF, 720 RPM

1— 60 HP. Type TS, .8PF, 1200 RPM
1—100 HP. Type TS, .8PF, 900 RPM
1—150 HP. Type TS, .8PF, 900 RPM

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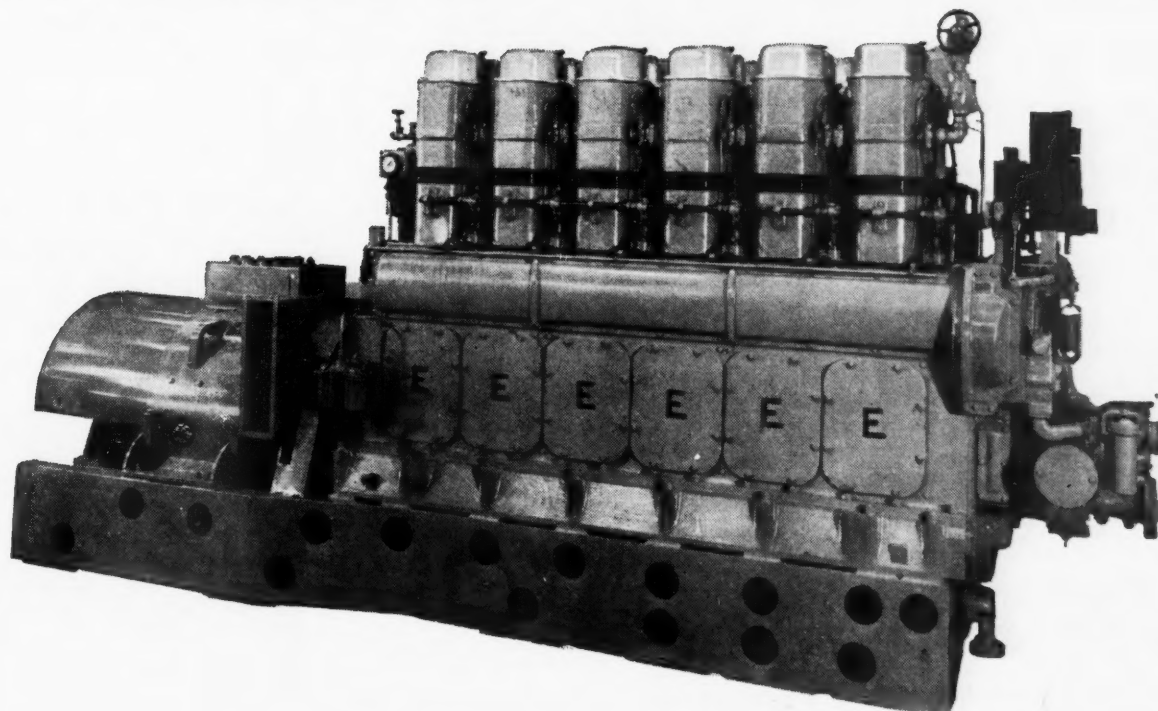
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15—250 KW, Elliott Direct Current Generators, 120/240 volt, 3 wire compound wound, 450 RPM. Complete with all necessary auxiliaries.

Large supply of brand new spare parts available

HP	MODEL	KVA	RPM	NEW	HP	MODEL	KVA	RPM	NEW
8—1600	General Motors 16-278A	1200	720	95%	10—225	Buckeye Model 80	180	600	new
1—450	Fairbanks Morse 32F	375	360	95%	1—180	Fairbanks Morse YVA	150	257	95%
1—375	McIntosh Seymour	350	360	85%	3—165	Murphy ME650	145	1200	95%
1—365	Ingersoll Rand S	340	600	95%	2—150	Buckeye Model E	145	400	95%
4—360	Fairbanks Morse YVA	300	257	80%	1—90	Cummins HIS 600	62.5	1200	new
5—350	General Motors 8-268A	250	1200	95%	1—80	Fairbanks Morse YVA	65	300	85%
1—300	Buckeye Model E	250	400	90%	1—75	Buckeye Model J	62.5	600	95%
2—240	Fairbanks Morse YVA	200	257	85%	1—40	Buckeye Model J	30	600	95%

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Model 1201 Lima Standard Shovel and Dragline. 80' boom, 3 yard bucket; 32' 6" shovel boom, 22' stick, 3 1/2 yard dipper.

1055 P&H Combination 3 yard Shovel and Dragline. Standard shovel front, 3 yard dipper. Dragline boom 90', 3 yard bucket, Buda diesel engine.

Model 1500 P&H Electric Dragline. 135' boom, 3 1/2 yard bucket. 3 phase, 60 cycles, 2,300 volts. Excellent condition.

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80D Northwest Combination 2 1/2 yard Shovel and Dragline. Completely rebuilt.

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40A Marion Dragline. 85' boom, 2 1/2 yard bucket. Completely rebuilt.

585 Link-Belt Diesel Dragline. 70' boom, 2 1/2 yard bucket, D17000 Caterpillar engine. Completely rebuilt.

802 Lima Combination 2 yard Shovel and Dragline. D17000 Caterpillar engine. 1 year old.

Model 45-B Bucyrus-Erie Dragline. 65' boom, 2 1/2 yard bucket, Buda diesel engine.

855-B P&H Diesel Shovel. 26' boom, 16' stick, 2 yard dipper.

48-B Bucyrus-Erie Combination Shovel and Dragline. Standard 2 yard shovel front, 65' dragline boom.

3,500 Manitowac Combination High Lift Shovel and Dragline. 75' dragline boom, 3 yard bucket, 45' boom, 34' stick, 2 yard dipper.

78D Northwest Shovel and Dragline. 2 yard dipper, Murphy diesel engine, Dragline boom 60'. Completely rebuilt.

K-480 Link-Belt Dragline. 75' boom, 2 yard bucket, Waukesha-Hesselman engine. Very good condition.

Model 3000 Manitowac 1 1/4 yard High Lift Shovel and Dragline.

Model 77 Lorain Shovel. 1 1/2 yard dipper, D13000 Caterpillar engine. Recently overhauled.

Northwest Model 6 Combination 1 1/2 yard Shovel and Dragline. Murphy diesel engine. Never used. Backhoe attachment available.

Model 602 Lima 1 1/2 yard Combination Diesel Shovel and Dragline.

Model K-370 Link-Belt Dragline. 60' boom, 1 1/2 yard bucket, Waukesha-Hesselman diesel engine. One year service.

Model 362 Marion Standard Shovel. 1 1/2 yard dipper, D13000 Caterpillar diesel engine. Completely rebuilt.

105 Northwest Combination Shovel and Crane. 24' boom, 17 1/2' stick, 1 yard dipper, 35' crane boom, Twin City 4 cylinder gas engine.

342 Marion Combination 1 yard Diesel Shovel and Dragline. Used nine months.

55 Lorain 1 yard Shovel. Gas engine. Overhauled. Serial #4245.

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Model 20B Bucyrus-Erie 3/4 yard Diesel Shovel.

Bay City 1/2 yard Combination Shovel, Backhoe, and Dragline. Buda diesel engine.

P&H Model 150 1/2 yard Dragline. Ford V-8 100 h.p. engine, 30' boom, completely rebuilt.

Model 44 Loomis Clipper Blast Hole Drill with new Hercules engine.

D-8 Caterpillar Tractor and Angledozer.

D-7 Caterpillar Tractor and Angledozer.

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 1—50 H.P. G.E. MT slipring, 695 RPM.
 1—60 H.P. G.E. West. CS SB 1800 RPM.
 1—100 H.P. G.E. KT 1800 RPM.
 1—100 H.P. G.E. I-K 1800 RPM.

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 3-5-7 1/2-10 H.P. Westinghouse SK 850 RPM. 230V. reasonable.
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 1—30 H.P. West. CI 638, 900 RPM.
 1—30 H.P. West. CI 960 RPM.
 1—30 H.P. West. CW 900 RPM.
 1—35 H.P. G.E. ITC 5012 1200 RPM.
 1—35 H.P. West. CI 652-D 690 RPM.
 1—50 H.P. West. CW 690 RPM.
 1—50 KW West. MG set, 125 V. 1150 RPM., compound wound, complete with charging panels.

**PENN ELECTRICAL
 ENGINEERING COMPANY
 SCRANTON, PA.**

WESTINGHOUSE TYPE SK—MOTORS

WIRE INQUIRIES COLLECT

**MOTORS, GENERATORS,
 TRANSFORMERS**



1 — 1500 H.P.
 Bought and Sold
 New and Rebuilt

ELECTRIC EQUIPMENT CO.
 Rochester 1, N. Y.

FOR SALE

36" GAUGE RAILROAD EQUIPMENT

6—10 - Yard Western, All - Steel
 Manually Operated DUMP
 CAR With Lift Doors.

PRICED TO MOVE:

IRON & STEEL PRODUCTS, INC.

43 years' experience

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"ANYTHING containing IRON or STEEL"

AIR COMPRESSORS

2—175' CFM Inger-Rand 2 cyl. vert. 150 P.S.I. Type XIV, dir. con. to G.E. 50 HP. DC, motor, 230 V., 400 RPM. Mounted on factory cast iron base. Complete with intercooler, unloader and accessories.

2—1,500 CFM Penna. 110 P.S.I. horiz. 2-stage, Class DCE-2, with direct motor drive, 300 HP, Elec. Mach. syn. motor, 3 ph., 60 cy., 2,300 V., 225 RPM, with intercooler and aftercooler and accessories. Request Bulletin D-100 for other compr. in stock.

PHILADELPHIA TRANSFORMER CO.

Box 566

Dalton, Pa.

FOR SALE

MINING MACHINES

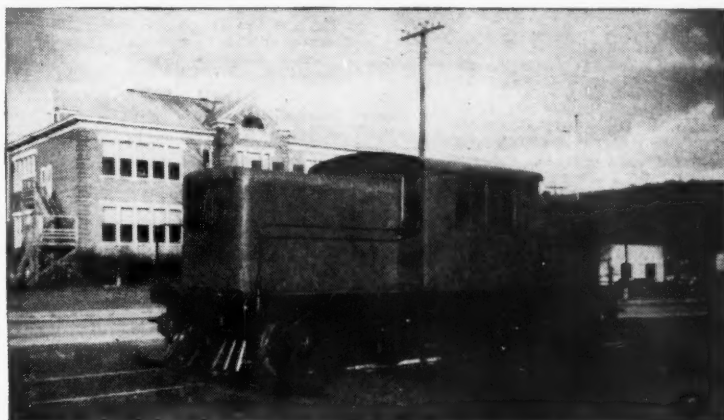
3 Sullivan 7-B Shortwall Mining Machines, 250 volt D. C., 8 1/2 ft. bar, with Joy Caterpillar Trucks. In operating condition. Available now.

W. G. DUNCAN COAL COMPANY, INC.
 Greenville, Kentucky

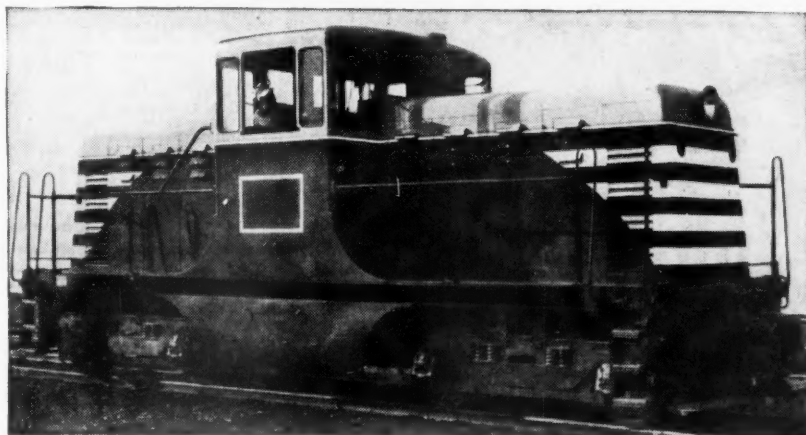
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Excellent Condition • Attractively Priced

ONE GENERAL ELECTRIC 44-50 TON GAS ELECTRIC LOCOMOTIVE



Rebuilt in 1944—2 Winton 175 HP gasoline engines with GE 514 generators



Built in 1942—Standard Gauge. 380 HP. Classification B-B-88/88-GE 733

ONE GENERAL ELECTRIC 44-TON DIESEL LOCOMOTIVE

• POWER EQUIPMENT •

- 3—1500 KW Westinghouse rotary converters: 60 cycle — 600 volts—6 phase—600 RPM, 2500 DC amps. with switch gear.
- 2—400 KW Allis Chalmers booster sets.
- 1—500 KW Westinghouse motor generator set. Transformers.

Write or Wire Collect for Details

FRANK M. JUDGE & COMPANY, INC.

(Transportation Specialists)

7010 EMPIRE STATE BLDG., NEW YORK 1, N. Y.

SEARCHLIGHT SECTION

MINING MACHINES

Jeffrey: 2-36B, 28A, 260 V. 1-24B Low Vein. 4-29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C. 2-Longwall 24B.

Goodman: 12A, 12AB, 12AA, 12G3A, Short-walls. 424, 24B, 124EJ Slabbers. 1-12G3, 220 volt and 3-17 DA, 2 DA, 500 volt.

2-Permissible Type 12CA, 6-112AA. Motors for 212 G3-Volts 220. Phase 3.

1-Hitch Cutter for Cross Head timbers.

2-Goodman Slabbing Machines, permissible type, 250 and 500 volts.

3-Longwall Low Vein Type 11AA on self-propelling truck 250 V.

Sullivan: CE7, CE9, CE10, CR10 Low Vein. 1-Buddy Sullivan 220 Volt, 3 Phase.

SUBSTATIONS—275 volts, D. C.

1-150 KW. G. E. MG Set.

1-300 KW Westing. Rotary. As is armature needs rewinding.

1-150 KW West. MG Set.

1-100 KW Ridgway MG Set.

1-200 KW H W Rotary Converter.

LOCOMOTIVES

Goodman: All 250 volts.

1-6 ton, 30B, 43" 1-5 ton.

1-5 ton 8-30 36" gauge.

1-6 ton type 8A.

1-5 ton type 42-0-4-2.

Westinghouse: All 250 volts.

906 motors and 102-904-115.

Bar steel frames 10 ton, 6 ton, and 4 ton.

G. E.: All 250 volt.

6 ton 803, 44" as is.

6 ton 823, 44".

6 ton 801.

8 ton 839.

1-8 ton type HM 61.

6 ton 819-821.

LOCOMOTIVES

5 ton 826, 44" and 36".

8 ton 839.

2 motors for 8 ton 839.

Jeffrey: 8 ton, 250 volts, type MH73. 1-4

ton MH 12. Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH110, MH78, MH73 and MH64-350 V. and 500 V. 29B, 35B and 28, 35BB, 35A, 29C, 29L, 35L.

Goodman: 34B, 30B, 30C, 12A, 2600 K and R; 12AB, 12AA, 33-1-4-T, 31-1-4-T, 32-1-4-T.

General Electric: 801, 807, 819, 821, 825, 839, 81.

Westinghouse: 904, 905, 906, 102, 907, YR2, 115. Also 200 KW.

200 KW Westinghouse Rotary Converter Armature: 250 V. Bracket Type, 150 KW G.E., HCC Bracket Type.

Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.

Automat Loader: 1 Myers-Whaley #4.

Belt Conveyors: 1 Bucket Elevator Conveyor.

Bit Sharpeners, 2 Sullivan, 1 Diamond.

Blue Print Machine: 42" wide, continuous

Mercury Arc Light.

2 Loading Booms: 40'x6' with Picking Table.

Bond Welders: Resistance.

Circuit Breakers: AC and DC.

Circuit Breakers, Automatic: 250 volt, 600

amps.

Circuit Breakers, Manual: 600 amps to 3,000

amps.

Clam Shell Bucket: 1 1/2 cubic yard.

Coal Crushers: (double roll) 16"x16", (single

roll) 24"x30", 24"x24", 36"x36", 30"x30",

18"x18", 12"x18".

Conveyors: Scraper type.

OTHER ITEMS AVAILABLE

Compressors & Jackhammers, Compensators, Drop Bar Supports: (Gooseneck) 29B and 29C.

1 Revolving head for 29C.

Dumps: Crossover.

Field Frames.

Generators: DC 250-275 volt, 30 KW to 100 KW. 1-50 KW 3000 R.P.M., 250 Volt.

Holsts:

Holsts: overhead, AC 3-60-400 1 ton and 2 ton. Crabs and Room Holsts.

Lathes: 48"x14" with Taper Attachment and 3-60-250 Motor.

Loading Machines: Myers-Whaley.

Milling Machines, horizontal and vertical.

Mine Cars: 48" gauge.

Mining Machine Trucks.

Motors: Miscellaneous and 1-50 HP Fynn Weichsel, 1800 RPM, 220 Volt, Slipring or synchronous Crane type. 1-oilwell motor,

2 speed 575 and 1150-HP, 15' and 30', 440 volts. Slip Ring with control and pole

changer and series motors.

Motor Starters and Controllers: AC and DC.

Plants: Diesel Power. Synchronous Motor Starters, full Magnetic Across-the-line, 3

phase, 60 cycle. 4-150 Volts—2-200 H.P. and 6-250 H.P. Westinghouse starters,

automatic, magnetic, reversible.

Synchronous motor starters and starters.

1-165 H.P. 440 volt with resistance for

slip ring. Motors, 1-100 H.P. 250

volt DC.

1-Bread mixer with AC motor.

Belted 400 ft. 26".

Pulley flat belt-V and conveyors.

Plants natural gas 300 H.P. with DC.

Generators 250 volts and smaller sizes.

Pumps: Rebuilt and New.

R. R. Switches: 85# and 100#.

Slate Larry: 2-Myers-Whaley, #3 and #4.

GUYAN MACHINERY COMPANY,

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ARMY FIELD

Telephones

perfected for the armed forces
under battlefield conditions.

NOW Job-Proved

for long, trouble-free service and greater efficiency in linking the scattered units of mines . . . quarries . . . strip pits . . . construction projects . . . refining plants, etc. . . wherever you need quick, low-cost, dependable 2-way communication!

- COMPACT!
- RUGGED!
- PORTABLE!
- EASY TO USE!

Performance equals present day commercial telephones . . . up to 17 miles!

Here's the dependable handyman you need to help reduce operating costs and increase your daily output. Simple to install. Just hook up terminals to any 2-strand wire; up to four phones on same line if desired, without switchboard. Operates on standard flashlight batteries. Sold in pairs . . . each phone complete with hand generator and self-contained ringer. Easy to move from one assignment to another. Wire can be quickly laid on the surface or underground . . . or strung between trees or poles to handle odd-job communication . . . maintenance and housekeeping chores . . . between adjoining mines . . . from pit to tippie . . . preparation plant . . . spoil area . . . shop . . . stockpile . . . engineering crew . . . mine rescue crew. Saves time . . . satisfies the needs of latest mining practices for safety and efficiency. Every phone guaranteed.

Write for Free Folder on Field Telephones. Also available: compact, rugged Army Field Switchboards for complete systems up to 24 phones.

All shipments FOB Sacramento. No. COD. Purchase orders accepted from firms with D & B Rating.

NEW—with heavy canvas case. Per Pair: \$29.50 single phone: \$14.75.
NEW—with leather case. Per Pair: \$32.50; single phone: \$16.25.
NEW—canvas or leather case, with case slightly soiled, etc. Performance equals new telephones. Per pair: \$24.50; single phone: \$12.25.
USED—good, serviceable condition. Per pair: \$19.50; single phone: \$9.75.
Extra Wire. Genuine 2-strand W-110 Army Field Wire. 500 ft. \$3.50. 1/4-mile reel \$10.50. 1-mile reel \$16.00.

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HIGH GRADE TOOLS

30" King Vertical Boring Mill, 1 head.
24" and 42" Bullard Vertical Turret Lathe.
42" N-B-P Car Wheel Borer, M. D.
60" Bullard Vertical Boring Mill.
3" Bar Fardick Horizontal Boring Mill.
18"x10" Boye & Emmes Lathe.
20"x12" Sidney Geared Head Lathe.
20/48"x10" Rahn-Larmon Gap Lathe.
20/40"x14" Schumacher & Boye 2 spdie. Lathe.
2" to 6" Plain Radial Drills.
25" Weible Upright Drill Press.
16" and 24" G & E Shapers.
26" Smith & Mills Shaper.
30"x30"x10" Cincinnati Planer.
150-ton Hydraulic Wheel Press.

Also various other machine tools.
Send us your inquiries.

Cincinnati Machinery Company, Inc.
217 E. Second Street Cincinnati 2, Ohio

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1 1/2 to 10 Ton 13" to 54" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Pa.

REBUILT MINING MACHINES

2-122 AA Goodman 250 Volts
1-112 G3A Goodman 220 Volts
2-12 A and 12 AB Goodman 250 Volts
4-CE 7 Sullivan AC and DC

LOCOMOTIVES

1-Elec. Hoist, 40 H.P. Motor
1-5 ton GE Trolley and Battery combination
1-6 ton Goodman type 2600 250 Volts
2-T. B. Sullivan 250 V. D.C.

LOADING MACHINES

1-7 BU Joy 250 Volts 42" gauge
2-5 BU Joys 250 Volts 42" gauge
1-8 BU Joy 250 Volts 42" gauge

THOMAS GILLESPIE & SONS

State Road 67, BICKNELL, IND.
Phones 179 and 149-K

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS—250 v. D.C.

(Motors 220/440 or 2200 v., 3 ph., 60 cy.)

No.	KW.	Make	Speed
1	500	Allis Chal.	1200
1	200	G. E.	1200
1	175	West.	1200
1	150	Ridgway	900
1	125	Allis Chal.	1150
1	110	Westg.	700
1	100	Allis Chal.	1150
2	75	G. E.	1750
1	50	Ridgway	1200
1	50	Ideal	1750
3	40	West.	900
1	30	West.	1200
1 New	25	Burke	1800

D.C. GENERATORS — 250 v. D.C.

No.	KW.	Make	Speed
1	250	Allis Chal.	1200
1	175	G. E.	700
3 New	135	G. E.	1150
1	125	West.	560
1	125	Allis Chal.	1150
1	110	West.	700
1	100	Allis Chal.	1150
1	75	West.	750

A.C. GENERATORS—2200/4000/440/220 v.

No.	KW.	Make	Speed
1	125	West.	257
1	450	Elec. Machy.	120
1	1250	West.	1200

D.C. MOTORS—230 volts

No.	H.P.	Make	RPM.	Type
1	175	G. E.	550	MD
1	150	G. E.	875	CDM
3 New	150	Star	1800	F-92
3 New	133	G. E.	875	CDM
1	125	Allis Chal.	850	E. R.
1	80	West.	450	—
3	40	West.	625	MC
3	40	Cr. Wh.	1700	CM
1	30	Cr. Wh.	1750	CMC
1 New	25	West.	600	SK-113
1	25	F. M.	950	CP
1	25	West.	1100	SK

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

- 456—New 1 HP. Cutler Hammer across the line.
- 111—New 1 HP. Cutler Hammer across the line.
- 30—New 2 HP. Cutler Hammer across the line.
- 55—New 5 HP. Cutler Hammer drip proof. 2 step current limit OL and LV.
- 58—New 7 1/2 HP. Cutler Hammer.

- 60—10 HP. Cutler Hammer Magnetic.
- 12—10/15 HP., 230 V. Westinghouse Magnetic Drip Proof Controllers, 2 steps acceleration thermal overload relay with stop, start and reset buttons.
- 9—New 10/15 HP., 230 v. G.E.
- 10—New 20/35 HP., 220 v. Ward Leonard Magnetic.
- 10—New 40 HP., 230 v. G.E. Magnetic.

A.C. MOTORS—4000/2200/220/440 V.—3-Ph., 60 Cy.

No.	HP.	Make	Rpm.	Type
1	500	Elec. Mach.	120	Syn.
1	750	West.	1200	Syn.
1	1000	West.	1200	Syn.

CONVEYORS

- 3—G-20 Goodman Shaker Conveyors each with a Goodman Duck Bill complete with motor equipment with 250. DC. motors.

PUMPS with A.C. or D.C. MOTORS

Qua.	Gpm.	Head	Kind	Make
3	1200	300	Cent.	Worthington
3	1100	323	Cent.	Worthington
3	1000	336	Cent.	Worthington
3	900	355	Cent.	Worthington
3	800	378	Cent.	Worthington
3	800	150	Cent.	Worthington
3	735	161	Cent.	Worthington
3	665	168	Cent.	Worthington
3	600	132	Cent.	Worthington
1	600	105	Cent.	Dayton Dowd
1	600	100	Cent.	Morris
1	532	139	Cent.	Worthington
1	500	115	Cent.	Dayton Dowd
1	500	123	Cent.	Morris
1	450	40	Cent.	Gardner Denver
1	400	50	Cent.	Dayton Dowd
1	400	140	Cent.	Morris
1	335	60	Cent.	Dayton Dowd
1	300	145	Cent.	Morris
1	300	125	Cent.	Dayton Dowd
1	244	60	Cent.	Dayton Dowd
1	210	60	Rotary	Nat'l Transit
2	200	125	Cent.	Worthington
1	200	72	Cent.	Morris
1	200	125	Cent.	Dayton Dowd
2	180	150	Cent.	Worthington
8	180	10	Cent.	Allis Chalmers
8	170	12	Cent.	Allis Chalmers

LOCOMOTIVE MOTORS

- 3—Westinghouse MH-58 35 H.P., 250 v., 430 rpm.

HOISTS or WINCHES

- 200—1 1/2-ton Hand Cranked ratchet 27:1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of 1/4" cable, ratchet type brake, push button release.

CAR PULLERS

- 100—Brand New with 1/4" cable, 1 1/2 and 2 ton A.C. or D.C. Motors.
- 1—Stephen Adams Car Puller, 1" dia. cable 10:1 with 25 A.C. or D.C. Motor.

FIRE PUMPS

- 3—1,000 GPM Worthington, 150# delivery press, head or test pres. 225 lbs., dir. con. 133 HP., 875/1750 rpm., 230 V. D.C. G.E. Motors and controllers.

COMPRESSORS

- 1—315 CFM. Ingersoll Rand Portable, 100 lbs. pres., driven by 105 HP. Waukesha Oil Engines, 860 rpm.
- 10—240 CFM Westinghouse 3 cyl. vert. 150 lb. pres. with dir. con. 54 H.P. Westinghouse slipping Mtrs. 220/440/3/60 Automatic Unloaders.

STORAGE BATTERY LOCOMOTIVE

- 2—4-ton Goodman type M with Edison 63-G-18 battery with 2 motors, 11 hp., 80 v. with double reduction gear, speed 3 1/2 MPH, 2,000 lbs. draw bar pull. Spare set of batteries and battery box, also spare parts.

ENGINE GENERATOR SETS

- 6—New 1 kw., Homelite portable, 14.25 Gas
- 3—New 1 1/2 kw., Homelite, 115 v. 1 ph., 60 cy. portable Gas
- 3—1 1/2 kw., Homelite, 14.25 v. D.C., portable Gas
- 6—2 kw. NEW Homelite, 28.5 v. D.C. Gas
- 3—5 kva. 120/240 v., 1 ph., 60 cy., dir. con. to 6 HP. Witte DIESEL.
- 1—7 1/2 kw., 120/240 v., 1 ph., 60 cy. Master dir. con. Wisconsin air-cooled Gas Eng.
- 2—10 kw., 120 v., D.C. 1200 rpm., dir. con. to Hercules Diesel
- 3—New 25 kw. 120/208 v. 3 ph. 60 cy. Westinghouse dir. con. to 4 cyl. 70 HP. Leroy Gas Engine
- 2—30 kw. G.E. 125 v. Buda DIESEL
- 2—30 kw., 220 v. D.C. Buda DIESEL
- 1—35 kw., Ridgway 220/3/60 Steam
- 2—30 kw., 110/220 v. 60 cy. 1200 rpm Rogers DIESEL
- 10—100 kw. 250 v. D.C. Superior DIESEL.
- 1—125 Kva., 220 v., 3 ph., 60 cy., Erie Ball STEAM

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH [6], PA.

Montrose — 5800

FOR SALE

CRUSHERS

- 1—Stephens Adamson 30x30 double roll crusher. Will crush from 2" down to 1/4".
- 1—Link Belt 36x60 double roll crusher, equipped with gear drive.
- 1—American Pulverizer crusher #1627. Type AC. machine number AC3B, crushes from 20" down to 1/4".
- 1—McNally Pittsburgh 18x18 double roll crusher.
- 1—20x20 Link Belt double roll crusher.
- 1—Jeffrey single roll crusher, size 36x36, No. 4507. Will crush maximum lump of 20" at rate of 250 tph to a product of 1 1/4" when operating at 300 rpm. Direct connected by flexible coupling to 75 HP G.E. motor, 3/60/440, speed full load 885, ball-bearing, fan cooled.

FAN

- 1—Bayley #17 Plexiform fan, Type F, wheel diameter 93 1/2" circumference, 24.478 ft. outlet area, 39.376 sq. ft. Capacity ranges from 39,376 CFM at outlet velocity of 1,000 to 141,759 CFM at outlet velocity of 3,800.

LOCOMOTIVES

- 1—4 ton Mancha Battery locomotive, equipped with Gould Batteries, 36" gauge.
- 2—4 ton Westinghouse locomotives, ball bearing, 36" gauge, 250 volts, DC.
- 1—5 ton Goodman locomotive, type W12A5, 42" gauge, 250 volts, DC.
- 1—6 ton Goodman locomotive, 36" gauge, 250 volts, DC.
- 1—6 ton Goodman locomotive, type 3304T, Ball Bearing, 36" gauge, 250 volts, DC.

- 1—6 ton General Electric locomotive, classification LM26MM5, R86E type controller, 36" gauge, 250 volts, DC.

- 1—10 ton General Electric locomotive, ball bearing, 36" gauge, 250 volts, DC.

MINING MACHINES

- 2—Sullivan type CH18, AC longwall mining machines, 3 phase, 60 cycle, 220 volt, 30" cutter bars, complete with 300' each of 3 conductor mining machine cable.
- 2—Goodman Universal mining machines, type 112G3, 36" gauge.
- 5—Goodman type 512DG3A, AC shortwall mining machines. Complete with cable and jacks. 8' cutter bars. No trucks.

- 1—Jeffrey 35BB, AC shortwall mining machines. 8' cutter bars, complete with tip turn trucks, cables and reels.

- 1—Sullivan shearing machine type CH11, 250 volts DC, 42" gauge, 7 1/4" cutter bars.

- 1—Goodman Universal mining machine, 112AA, 42" gauge, 250 volts DC, 8 ft. cutter bar.

- 1—Goodman Universal 112EG3A, AC Shortwall mining machine, 3 phase 60 cycle, 230 volts, 6' cutter bar complete with cable and reel.

HOISTS

- 1—Ottumwa Iron Works single rigid cylinder-conical drum hoist, serial number 4050, complete with remote control and hydraulic brakes, constructed for following hoisting conditions: Weight of cage 6000#, weight of car 1600#, weight of coal average 2500#, total cage travel 277 ft. (HMD) size of rope 1 1/4", trips per hour 73, rest period, 15 sec. Balanced hoisting without slack rope, end lift. Post brake 72" diameter, 8" face. Direct connected to Western Electric 150 HP motor, 3 phase, 60 cycle, 2200 volts, slip ring, speed full load, 700 RMP, complete with automatic switch-board.

Other types and sizes of hoists, with and without motors.

PUMPS

All sizes and types of pumps.

We are distributors for John A. Roebling's Sons Company wire rope and fittings.

GAVENDA BROTHERS, Inc.

CANTON, ILLINOIS

**for IMMEDIATE DELIVERY
of RUBBER PRODUCTS**

CALL WIRE

WRITE CARLYLE

THE RUBBER HEADQUARTERS

CONVEYOR BELTING,
TRANSMISSION BELT-
ING, ELEVATOR BELT-
ING, FIRE, WATER, AIR,
STEAM, SUCTION and
WELDING HOSE.

CARLYLE RUBBER PROD-
UCTS ARE NEW, GUAR-
ANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	24"	4	1/8"	1/32"
42"	5	1/8"	1/16"	20"	5	1/8"	1/32"
36"	6	1/8"	1/16"	20"	4	1/8"	1/32"
30"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	5	1/8"	1/16"	16"	4	1/8"	1/32"
26"	5	1/8"	1/32"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"

Inquire For Prices — Mention Size and Lengths

TRANSMISSION BELTING

ENDLESS "V" BELTS

HEAVY-DUTY FRICTION SURFACE

	Width	Ply	Width	Ply	Width	Ply
In-	18"	6	10"	6	6"	5
quire	16"	6	10"	5	5"	5
For	14"	6	8"	6	4"	5
Prices —	12"	6	8"	5	4"	4
Mention	12"	5	6"	6	3"	4
Size and						
Lengths.						

"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
"D" Width All Sizes —
"E" Width All Sizes —

Sold in Matched Sets.
Inquire For Prices —
Mention Size and Lengths.

SPECIAL OFFER . . . HEAVY DUTY RUBBER HOSE

FIRE HOSE

APPROVED SPECIFICATION HOSE EACH
LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2 1/2"	50 feet	\$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1 1/2"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
1/2"	25 feet	\$5.00	\$1.50 Pair
	50 "	10.00	1.50 Pair
3/4"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE
All Prices—Net — F.O.B. New York

WATER HOSE

I.D. Size	Length	per Length	I.D. Size	Length	per Length
3/4"	25 feet	\$4.25		35 feet	\$10.50
	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1 1/2"	25 "	10.00
1 1/4"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

CARLYLE RUBBER CO., Inc.

62-66 PARK PLACE, NEW YORK 7, N. Y. Phone: BArlay 7-9793

**CONVEYOR BELTS
ONE DAY SHIPMENT**

1,675 ft. 36 in. 6 ply — New
1,120 ft. 36 in. 7 ply — Used
362 ft. 30 in. 6 ply — New
1,075 ft. 30 in. 5 ply — New
1,630 ft. 24 in. 5 ply — New
1,020 ft. 24 in. 4 ply — New
1,528 ft. 18 in. 4 ply — New

THE DARIEN CORP.

60 E. 42nd St., New York, N. Y.
Tel. MU. 2-0042

TRANSFORMERS

2—500 KVA Pittsburgh.
1—500 KVA Westinghouse.
3—250 KVA Westinghouse.
3—150 KVA Pittsburgh.
6—150 KVA General Electric.
All single phase, 60 cycle, 23000/
2300 volts, in operating condition
and available for immediate de-
livery.

W. G. Duncan Coal Company
Greenville, Kentucky

FOR SALE

- 1 Complete Smith drag line entry type conveyor.
- 2 Smith clam boxes—size 4'x5 1/2'x15".
- 1 Smith clam box—size 4'x5'x15".
- 6 Smith drag line conveyor deflectors with jacks.
- 7 Tail rope cable sheaves.
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- 1 Extra set doors for 4'x5' Smith Box.
- 1 Ingersoll Rand 3 Drum Hoist, size 25 NNN3C with 25 HP. A.C. and D.C. motors.
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2 1/2 yard Diesel Dragline,
Marion Model, 40A, 85 ft.
boom. Excellent condition.
Located No. Dakota.

DAKOTA COLLIERIES CO.

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FOR SALE

- 3—Pittsburgh Coal Washer Basket Type Jigs, Capacity each 60 Tons per hour 5" x 1/4" Coal.
- 1—Pittsburgh Coal Washer Llewellyn Type Jig, Capacity 100 Tons per hour 4" x 1/4" Coal.

Complete with auxiliaries and sufficient spare parts for rebuilding all jigs. These jigs are in good condition and are in operation at present and will be available Feb. 1, 1948.

Amherst Coal Co. Lundale, W. Va.
Phone: Logan 142 or Man 2121

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2 Myers-Whaley No. 4 Type Shovel Machines, one machine completely overhauled September, 1947, second machine Fair Condition. For price or inspection arrangements write or call—

HANLEY COMPANY
Summerville, Pennsylvania

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Fifty (50) New Car Wheels, 2-7/32" bore to fit 2 1/4" axle, 14" O.D., 4 1/2" face, including the flange, 6 1/4" through hub with oil reservoir.

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Phone Bellefonte 795

LOCOMOTIVE

50-ton Vulcan gas-electric, std. ga.
Overhauled, with Am. couplers.

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10" dia. heavy canvas, mildew and water proof, fire resistant, flexible, steel wire spiral reinforcement; heavy brass fittings, one end male, one end female; suitable for blowing or exhaust. In original containers, four 25' lgths. per pkge., 24"x24"x44", approx. wt. net 110±, gross 200±. Never overseas. Subject to prior sale or other disposition.

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Rotary Con. & MG Sets (3 ph. 60 cy.)

640 KW Al. Ch. 250 v.—800 HP Syn. 2300 v.
(available 2 months.)
150 KW West. 125 v.—225 HP. 2200 v.
1—150 KW Rldg. 250 v.—225 HP Syn. 2300 v.
100 KW Burke 125 v.—2200/440/220 Syn.
50 KW G.E. 125 v. 75 HP G.E. 2200 v. 440/230 v.
35 KW Cr. Wh. 250 v.—50 HP 220/440 v.
3—New 10 KW 125 v. 220/440/3/60.
7½ KW Wooton 125 v. 10 HP. Wooton Vert.

GOODMAN SHAKER CONVEYORS

2—Goodman G 20 Shaker Conveyors with 200 v.
20 HP motors, also Goodman #3 Dusk Bills.

MINING MACHINES

1—35B Jeff. Perm. 250 v. 7½" Jeffrey Chain & Bar
on revolving trucks.
1—35B Jeff. Perm. 250 v. 6" Jeffrey Chain & Bar on
revolving trucks.
412G3 Goodman AC Mchcs., 6½" bar.

STORAGE BATTERY LOCOMOTIVES

1—6 Ton G.E. permissible 36/44 Ga. HM 835 BB.
4 Ton 86" Ga. Atlas 3 BB Motors.
1—5½ Ton Ironton Type A 36/42" Ga.

Haulage & Gathering Locomotives

13 Ton Westgh. 250 v. 36" or 40" Ga.
2—6-ton G.E. 250 v. HM 803 BB Motors, 36" Ga.
O.S. Rolled Steel frame with flat top motor
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10 Ton Goodman 36B04T O.S. fr. 250 v. 36" Ga.

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18x24 and 18x30 New Scottsdale dbl. roll.

DC MAGNETIC STARTERS

New 230 v. DC Magnetic Cutler Hammer.
Starters, 25, 40, 50, 60, 75 & 100 HP.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	Wdg.	Type
1400	West.	1200	Syn.	New 1 P.F.
1000	West.	1200	Syn.	New 3 P.F.
750	West.	1200	Syn.	New 1 P.F.
600	West.	900	S.R.	OW NEW
435	G. E.	450	Syn.	ATI
300	G. E.	365	S.R.	MT 415-25cy
300	West.	1800	S.R.	OW
250	West.	217	S.R.	CW 1814
150	West.	730	S.R.	CW
150	West.	1750	S.R.	C-I
100	G. E.	500	S.R.	M 1-25-cv.
60	G. E.	1100	S.C.	KT34
50	West.	500	S.R.	CW 658 D
50	G. E.	900	S.R.	1-M
50	G. E.	720	S.C.	1 K
30	West.	1750	S.C.	CS 405

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400 HP Vulcan conical drum shaft Hoist.
100 HP. Vulcan fixed drum 100 HP G.E. S.R. Motor.
1—50/75 HP 2 drum Meade Morrison slope.
75 HP Otumwa slope with AC Motor.
75 HP Vulcan 2 drum shaft, S.R. Motor.
40 HP Lidgerwood sgl. ft. drum geared to A.C.
25 HP sgl. friction Hoist—230 v. DC Motor.
15 HP Otumwa sgl. fr. tdr.—15 HP. SK 230 v.
10 Ton Larry Car, 500/250 v. DC.
10 HP Fridy Car Puller, AC Motor.
10 HP Flory sgl. fric. 22" D. 18" F6" flanges.
4—10 Ton Chisholm Moore Chain Hoists.
2—Fairmont Car Retarders.
1—1 Ton AC Monorail 220/3/60.
4—2720 GPM 85" Le Courtney Bronze fitted 10".
1—700 GPM 60" Wheeler Bronze fitted 5" Cent.
625 GPM 12" Hd. De Laval 10 HP 230 v. DC.
300 GPM 25" Hd. De Laval 1½ HP 230 v. DC.

300 GPM 44" Hd. DeLaval 10 HP. 230 v. DC.
150 GPM 52" Hd. DeLaval 5 HP 230 v. DC.

DC MOTORS GENERATORS, 230/250 v.

HP	Make	Speed	Wdg.	Type
1200KW	Al. Ch.	750	epd.	500 v.
1500	West.	600	sh.	500 v.
175	G. E.	475	ser.	MD 109
130	G. E.	550	ser.	CO 1813
100	G. E.	480	ser.	MD 108
60	West.	1750	sh.	SK 120L
50	Northern	600	ser.	K
50	G. E.	250/1000	sh.	RP16
50	Reliance	1750	ep.	166 T
40	G. E. (Vert.)	1750	ep.	OD 93
40	Roth	1500		
35	Reliance	700	cp.	CM
35	G. Wh.	700	sh.	S
25	West.	325/975	sh.	SK 63
20	West.	1150	sh.	SK 93
15	Wh.	800	cp.	CM
15	G. Wh.	1400/1700	sh.	CM
15	West. (Enc.)	235	ep.	SK 113
10	G. E.	1750	sh.	CD
7½	G. E.	1750	sh.	HL
5	Reliance	1750	sh.	14T

AIR COMPRESSORS

1200 cu. ft. 100# Worthington 2 stage Belted.
750 CFM 100# Ch. Pa.—150 HP West. S. R.
173 cu. ft. 100# Pres. Chie. Pneu. Belted.
1—90 cu. ft. 100# Pres. Chie. Pneu. Belted.
1—75 cu. ft. 100# Chg. Pneu.—AC Motor.

AC MAGNETIC STARTERS (3 ph. 60 cy.)

2—700 HP West. 2300 v. Syn. Motor Starters.
200 HP G. E. Rev. Hoist Control, 2300 V.
1—126 HP. 440 v. Ekn. reduced v. Comp.

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Mayflower 7900

Pittsburgh 19, Penna.

Serving the Coal Industry for more than a Quarter of Century

For Sale CUTTING MACHINE

One (1) 29 C Jeffrey Arc
Wall Top Cutting Machine,
250 Volt DC, 42" track gauge.

This machine is available
for inspection at Tioga, West
Virginia, and is ready for
immediate delivery.

Tioga Coal Corporation
Tioga, West Virginia

FOR SALE

1—Ridgeway M.G. Set, 2300 volt Synchron-
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Generator, Switchboard and Control.

4—Louis Allis, 15 H.P., 1750 R.P.M., 230
volt, D.C., enclosed ball bearing motors.

1—M.S.A. Portable Rock Duster, Cat. No.
AL 14561—Size-0, 230 volt D.C.

Miller Connector Boxes, #2 and #12
3 Cond. Connectors.

RALEIGH MINING CORPORATION
R. D. #4, Sanford, N. C.

FOR SALE

SARGENT SHOVEL

¾ yard, good condition, recently over-
hauled, 40' crane boom can be supplied,
priced to sell.

FS-3389, Coal Age
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10 H.P., 230 v. D.C., 850 RPM. Compound
WD. Frame 93, Drip-Proof Closed Case.
Ball Bearings.

5 H.P., 230 v. D. C., 850/1750. Stabilized
Shunt WD. Drip-Proof Closed Case, Sleeve
Bearings. Frame 43.

3 H.P. same as 5's above except in Frame
284.

3 H.P., 230 v. D.C., Stabilized Shunt WD.
D-P Closed Case, SL. Bearings. Frame 254.
1750 RPM.

All of the Above Motors Are Priced at the
List Price Less 40% F.O.B. Knoxville, Tenn.

New—General Electric 230 v. D.C., 1550
RPM., 17½ H.P. Ball Bearings, CMP. WD.
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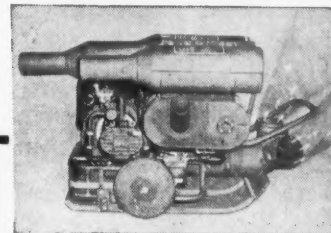
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PHONE 28639

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Rotary Dump and Trip Feeder, end rings
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Motors and Controls.

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PORTABLE HEATERS

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Especially Adaptable for
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STEWART-WARNER portable powerful
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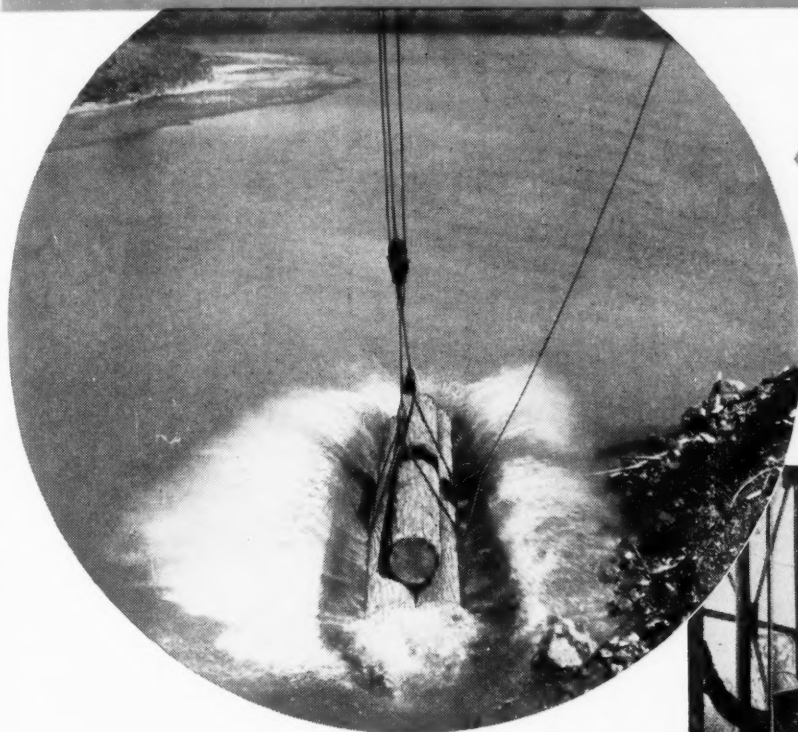
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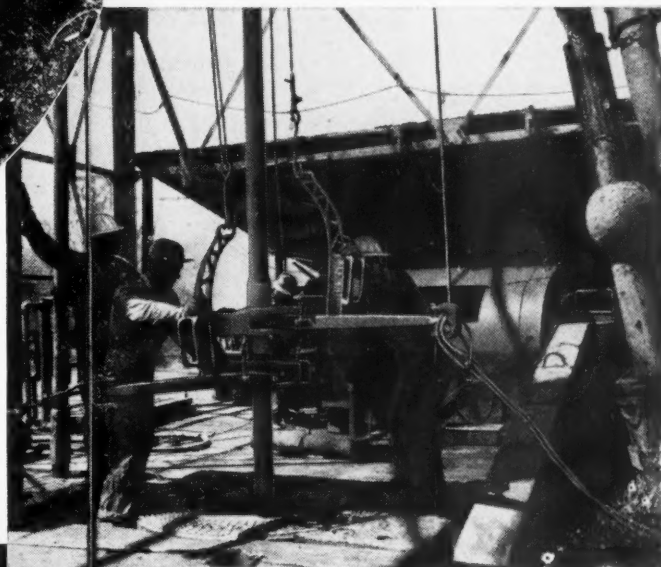
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Improving Production with **LAY-SET** PREFORMED



▶ **Dropping logs** into the river with a swing boom unloader. When logs hit water an automatic trip on the hooks frees the mainline straps. Buoyancy of logs in water slacks the mainline, and weight jerks hooks free from strap loops. With a load of 5,000 board feet (40,000 pounds), that's a lot of lifting, jerking and quick-slackening for the wire rope—but Hazard LAY-SET Preformed takes it in stride.

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▶ **Short wall cutting machine** at work in a coal mine. Here, where wire rope failures would seriously affect production, operators depend upon LAY-SET Preformed wire rope. Its longer life means steadier, more profitable production.



LAY-SET Preformed wire rope will improve production on your lifting and pulling jobs too. Be sure to specify LAY-SET Preformed the next time you need wire rope.

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LINK-BELT

DOCK

STORAGE-HANDLING

for a Half Million

Tons of Coal

● Flexibility, high efficiency, large capacity and low handling cost per ton are secured by Link-Belt conveyors and unloading tower in service of Century Coal Company at Depot Harbour, Ontario, Canada. Handling coal for storage and reshipment to various coal importers, the dock has a total storage capacity of 500,000 tons, with 650 tons per hour stocking out capacity.

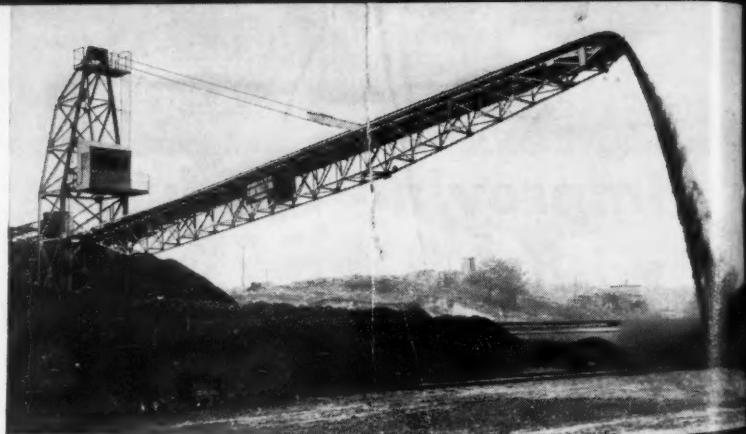
The rope trolley type tower has a stationary cab which gives the operator clear view of the 5-ton capacity clamshell bucket and its discharge into 40-ton receiving hopper. A 48" wide steel apron conveyor feeds coal from hopper to dock conveyor, which feeds to transfer conveyor feeding to stocking out conveyor. Other Link-Belt equipment includes a traveling, revolving stacker with 42" belt conveyor mounted on a hinged steel boom.

Link-Belt "know-how" and equipment are solving coal handling and preparation problems all over the world.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

10,886



Top Photo: Close-up view of Link-Belt traveling, revolving stacker belt conveyor stocking out coal. Note elevated operator's house.

Middle Photos: Show belt conveyor and how the long belt conveyor delivers coal to traveling revolving stacker belt conveyor and the traveling unloading tower while unloading a ship.

At Left: General view of the end of the coal storage dock.



COAL PREPARATION AND HANDLING EQUIPMENT

Engineered,
Built and Backed by



LINK-BELT